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Before submitting manuscripts for publication authors should consult Information for Contributors to the Journal of Speech and Hearing Disorders, *JSHD*, 14, 1949, 93-94. Prospective authors are invited to write the Editor for copies of this Note, and of its supplement, Examples of Manuscript Form.

The American Speech and Hearing Association
TWENTY-NINTH ANNUAL CONVENTION
November 23-25, 1953, Hotel New Yorker, New York City

THE PROGRAM COMMITTEE is now making final plans for the 1953 convention. Until July 1 members of the committee will continue to receive papers for presentation at the convention, subject to the limitations stated in the 'Formal Call For Papers' in the March, 1953, issue of this journal.

One of the new features at the 1953 convention will be a series of simultaneous meetings under the general title 'Professional Problems.' These meetings are planned in order to provide members with an opportunity to meet with others working in similar situations, for an exchange of views and discussion of mutual problems. The group chairmen listed below will be glad to receive suggestions.

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Basic Physical Systems For Communication Between Two Individuals

Gordon E. Peterson

SPEECH IS MAN'S primary process of communication. One of the important marks of his ability to expand and enhance this process was realized centuries ago in the development of writing. The development of a series of symbols which represents the various sounds of speech, which is the essence of modern orthography, was a slow and tedious process.

While a spoken word in its original form is very limited in the region of space and time over which it can extend, the orthographic process greatly enlarges the possible range in both space and time of a particular message. Basically, the orthographic process supplies a quantized storage system for speech. The quantized storage of information is a very common process in the more complex forms of civilization found in many parts of the world today, and is essential to such civilization.

Transmission

As civilization became more complex the greatest need in communication was for more rapid methods of transmitting messages beyond the range of the human voice. In the more general sense progress on this problem can be stated in terms of transmitting, in real time, information of increasing complexity. In the creation of instruments one of the first important steps toward this goal was the development of the telegraph. In telegraphy the language is converted to a simple code for electrical transmission, and the code is reconverted to speech or writing at the receiving terminal.

It was approximately four centuries after the development of the first crude printing presses that Alexander Graham Bell invented the telephone. While in the use of the telephone the extent of a given message in time is essentially unaltered, the range of the human voice in space has been extended to many parts of the earth.

The next major step in the development of communication systems, almost simultaneous with the invention of the telephone, was the invention of the recording machine. Although the telephone affords immediate transmission to distant places, the recorder can store the speech signal for use at a later time, approximately in its original form.

The visual aspects of the speech process, which also convey information, of course, may likewise be transmitted or stored. Storage has been achieved by the development of the camera and film projector, and the recent development of television has made possible the direct transmission of visual patterns.

Figure 1 has been prepared to show the various types of physical systems

Gordon E. Peterson (Ph.D., Louisiana State, 1939) is engaged in research at the Bell Telephone Laboratories, Murray Hill, N. J.

which are of major importance in communication between two individuals. These systems provide transmission and feedback paths. At the left is shown the initiator of the message and at the right is shown the receiver of the message. The intermediate individual performs certain transformations on the message such as the interpretation of telegraph code. The three individuals are represented schematically. Only the most important sense organs for communication, the eye and the ear, are shown; likewise the most important motor organs for communication, the hand and the mouth, are shown. The feedback paths between the mouth and the ear, and between the hand and the eye, are also indicated on the diagram. The brain, B, is shown as the central perceiving and controlling mechanism.

The operations mentioned earlier are shown schematically near the top of the diagram. The orthography sheets represent the written form of the language. Transmission and storage of the acoustical signal are shown by the Telephone transmission line and the Radio linkage and by the Re-

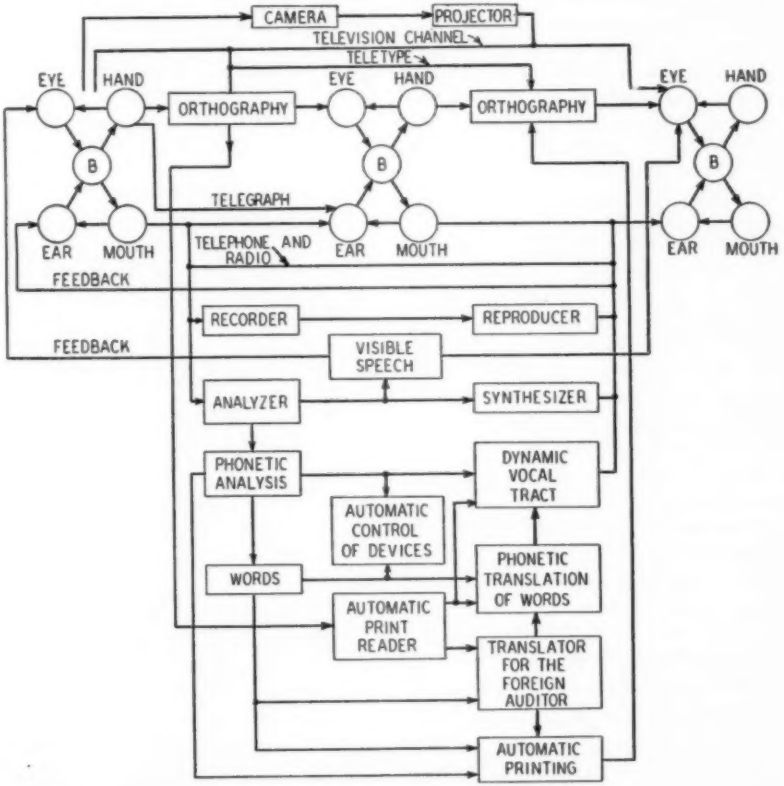

FIGURE 1. Fundamental systems in communication technology.

corder-Reproducer linkage. Transmission and storage of visual patterns are shown by the Television Channel and the Camera-Projector linkage, respectively. The immediate transmission of written material to distant locations is also possible through Teletype or Television, as indicated in the diagram.

Methods of wave analysis make possible certain more complex transmission systems which are also of considerable interest in communication. The first system of major importance for the transmission of speech which employed such an analysis was the vocoder. The device is of technological interest primarily in that it offers a means of reducing the channel capacity required for transmitting speech signals. In one type of this device, narrow band signals which represent the magnitudes of various analyzing filter outputs are transmitted. These signals control the levels of periodic and random energy in corresponding channels at the receiving terminal, so that an approximation to the original speech is reconstructed. Such operations are shown in the diagram by the linkage Analyzer - Synthesizer. Various types of vocoders are conceivable. In all vocoder transmission, however, certain details of the original signal are omitted, while important characteristics are transmitted. Yet in such a transmission, the speech output sufficently resembles the original signal that the speaker's voice, for example, may be identified.

Speech-Orthography Transformations

There is a large field of communication systems development in which very little work has as yet been done. This field involves complex transformations of language, such as the conversion of speech to printing, or the translation of English to French.

There are occasions when a message which originates as speech is desired in the written form, or when a written message is desired in the spoken form. Thus far the transformation of speech to orthography and the transformation of orthography to speech have required the services of an intermediate individual. In the diagram the operations are represented by the third person interposed between the originator and the recipient of the message. In the one case this third individual would set down in a quantized symbolism a representation of the speech which was dictated to him; in the other case, as an oral reader he would reconvert a sequence of symbols to speech. It is conceivable that the two functions served by this third person could be carried out by automatic devices.

Both of the processes are yet to be realized in communication technology. In terms of instrumentation, we desire a machine that will type in phonetic symbols the speech which is presented to it, and another machine that will reconstruct a standardized speech when a sequence of printed symbols is presented to it. Essentially, the first device involves the conversion of relatively continuous acoustic stimuli into quantized visual stimuli, and the second device involves the conversion of quantized visual stimuli into continuous acoustical stimuli.

These processes may be joined to form a transmission path, as shown in the figure by the linkage Analyzer-Phonetic Analysis – Dynamic Vocal Tract. Such a system will transmit primarily the phonetic content of the speech. The identity of the original speaker for the most part is lost and only a standardized type of speech is received.

There would be considerable practical application for such a transmission system. The importance of this application results from the fact that the channel capacity required to transmit only the phonetic content of speech is very much less than that required to transmit the full speech band. This is evident in the calculations of information theory. If a full speech band of 7000 cps is transmitted without distortion and with a signal to noise ratio of 50 db, the channel capacity in bits per second is given by:

$$7000 \log_2 (10^5 + 1) \doteq 116{,}000 \text{ bits/second}$$

On the other hand, if we assume a set of 100 equally probable phonetic units and a maximum rate of 20 per second, then the total channel capacity required is given by:

$$20 \log_2 100 = 133 \text{ bits/second}$$

There are, of course, a great many communication situations in which the transmission of only the phonetic content of the speech would be adequate.

Many practical applications of the phonetic reduction of speech are to be found in the control of devices by means of speech. The basic connections for these operations are shown by the Automatic Control of Devices section in the diagram. In the human, the brain is employed in the transformations of speech to printing and printing to speech. As is suggested by this fact, a great deal of fundamental research on speech and human perception is necessary before successful automatic apparatus can be developed for either of these transformations.

Foreign Translation

There is another type of operation which the intermediate individual, previously referred to in the diagram, is often called upon to perform. This operation is the translation from one language to another. The original form of the message may be either written or spoken (or in code), and the message may be desired in either the written or the spoken form.

The translation from one language to another has become of increasing importance in a world where peoples of many languages must live and work together. Eventually it may become possible to carry out such translation automatically. The operations required are indicated in the diagram by the connections leading to and from the Translator for the Foreign Auditor. In the design of an automatic translator the major problems are pattern matching, storage, and indexing or ordering.

Language Disabilities

Certain secondary communication systems are of importance for the blind and the deaf.

For the blind the problem is that of reducing ordinary printing to phonetic sequences; these can then be recreated as speech. In the simplest form the sequences might be nothing more than the names of the letters of the alphabet; they might also be a distinct phoneme or monosyllable for each of the letters. Such a conversion of printing is indicated by the direct connection from Automatic Print Reader to Dynamic Vocal Tract. The feedback path to the ear, among other things, would inform the blind person of his successes and failures in composing the orthography shown at the left in the figure.

Such reading systems may become practical in the future. At the present time, however, the tactile sense plays a

major role in the interpretation of printing by the blind. The representation of language in Braille is a sufficiently simple technical operation that it has been practical for many years. It is fairly obvious, however, that a universal print reading device would make immediately available to the blind a much wider range of literature.

The position among basic communication systems of visible speech instrumentation for the deaf is indicated in Figure 1. The feedback path is exceedingly important in the acquisition of speech by the deaf. The visible speech portrayal gives an indication of the direct speech output before it has undergone any process of symbolic reduction. Thus the subject is able to relate the visual patterns to the positions and movements of his speech organs.

Many consider the sense of touch as the most promising auditory substitute for the deaf. At this time views on this subject are largely a matter of speculation, and the question will probably not be settled in terms of practical instrumentation for many years to come. On the one hand, time is involved in the sense of touch in much the way it is involved in hearing. On the other hand, the sense of vision is a highly refined sense; the multi-dimensional nature of visual perception provides an excellent opportunity for the display of the various dimensions of acoustic signals. Obviously in the case of the deaf-blind, however, the sense of touch offers the only major path for the reception of linguistic signals.

Conclusion

Much progress toward the phonetic reduction of speech has already been made, and methods for the automatic translation from one language to another are now receiving serious consideration. Also, laboratory tests have been carried out on a device which will identify individual printed letters, a major step in the phonetic transformation of printing. The initial development of visible speech for the deaf has been achieved.

There is little doubt that these systems for the transformation of language will eventually hold a place of major importance in communication technology. Before such systems can successfully be developed, however, much fundamental research remains to be done. We may antitcipate that if the basic studies are successful a major reward of the research will be the increased insight into human processes which must result. For reasons such as these we may expect an even greater effort in the fields of speech analysis and experimental phonetics in the years to come.

Facial Skeletal Measurements And Tongue Carriage In Subjects With Repaired Cleft Palates

McKenzie Buck

SPEECH PATHOLOGISTS have long been interested in the velo-pharyngeal closure because of the relationship believed to exist between the completeness of this closure and nasal voice quality. The X-ray technique has been most often used in studying the action of the velum and the posterior pharyngeal wall. For the most part, the studies employing this technique have investigated only the velar and pharyngeal wall movements of normally structured persons.

Wolfe (*12*) investigated the movement, size and relative position of various structures involved in the velo-pharyngeal closure during phonation of sustained vowels. His subjects were not only normally structured but were judged to be non-nasal.

Norris (*8*) compared normally structured subjects who had been previously classified as (1) nasal, (2) denasal, and (3) normal in voice quality with respect to the vertical extent of the contact between the velum and posterior pharyngeal wall. Hixon (*6*) reports little difference between his nasal and non-nasal subjects with respect to the extent of posterior movement of the velum. Hixon, however, concerned himself also with the tongue, lip and jaw movements. In this study, the movement of the oral and pharyngeal structures of individuals with nasal voices presumed to be functional in causation were compared with individuals judged to have superior voices. The vowels [ɑ], [æ], [i], and [u] were selected for study as being representative of the range of tongue positions used for phonation of all vowels. His findings show slight tendencies for the nasal group to maintain as large or slightly larger mouth opening than the superior group. The findings also suggest that the nasal speakers tended to carry the tongue higher and further posteriorly in the oral cavity on the vowel [ɑ]. This was not true, however, when the tongue was at rest nor during phonation of the [i] and [u] vowels.

Some authors, Van Riper (*9*), Williamson (*11*), Fairbanks (*2*), and others have suggested that the tongue position and oral cavity dimensions play an important role in the production of nasal quality. The findings in Hixon's study tend to support such a theory.

The studies reported above have dealt only with subjects having normal oral and pharyngeal structures.

McKenzie Buck (Ph.D., Iowa, 1951) is Head of the Speech and Hearing Clinic, University of Florida. This article is adapted from a paper presented at the 1951 Convention of ASHA, Chicago, Ill., and is based on a portion of a doctoral dissertation completed under the direction of Professor James F. Curtis.

The only study reporting X-ray findings on subjects with abnormal structures was that of Harrington (*5*), who X-rayed three cleft palate subjects. The only measurements which he reports from these X-rays are concerned with the movement of the posterior pharyngeal wall. His findings showed movement occurring over a greater vertical distance than is usually indicated in discussions of the velo-pharyngeal closure. Little evidence was found of a pronounced bulge occurring at a particular location corresponding to the frequently assumed nature of Passavant's pad.

It has been observed clinically that some individuals with extensive clefts of the palate demonstrate less nasality than other individuals whose clefts are very small. That is, clinical observation does not indicate a close relationship between the extent of the opening into the nasal cavities and the degree of the nasal defect. The suggestion is strong, therefore, that other variables, such as tongue position, may be importantly related to the nasalization of speech in cleft palate cases. Van Riper (*9*), Buck and Harrington (*1*), McDonald and Baker (7), and others, have suggested that persons having clefts of the palate may habitually carry the tongue high in the oral cavity. This may occur in an attempt to fill the cleft in the palate. Clinical observation would also seem to indicate that perceptually there is less nasal quality on such vowels as [ɑ] and [æ] in cleft palate speech than on the closer vowels, such as [i] and [u], which may also be due to the relation of the tongue position to voice quality.

Purpose

The above discussion represents the background for the present study. The research results of the Hixon study suggest the importance of tongue movement and carriage in nasal quality among normally structured subjects. Clinical observation has indicated the possibility that a similar relation may hold for individuals with cleft palates. Moreover, there has been, to date, very little X-ray study of the movements of the oral and pharyngeal structures of cleft palate subjects during speech. Hence, there seems to be a need for more X-ray investigation of these processes in cleft palate subjects.

Procedure

Selection and Matching of Subjects. The cleft palate subjects were drawn from patients seen in the Department of Otolaryngology in the State University of Iowa Hospitals and from the Schools of Linn County, Iowa. Arrangements were made with the special education supervisors of Linn County to bring the latter subjects to the Speech Clinic for one day.

The following criteria were applied in the selection of the cleft palate group. Subjects to be included in the cleft palate group must have had at least a repaired cleft of the velum and a repaired cleft of the lip. The subjects finally selected all had complete unilateral clefts of the palate and lip. Each cleft palate subject was given a mental test to eliminate cases who were below the borderline level of intelligence (I.Q. 70). Because of the possible relation between voice quality and hearing, subjects having a hearing loss of more than 20 db between 256 cps and 2048 cps were not included. For the purpose of this study, it was desirable that the cleft palate subjects should have little or no formal training, since speech training, if effective at all, might well have

produced some modifications of the habitual movement of these structures. Each subject was carefully questioned as to the formal speech training he may have had and, if he had been exposed to specific exercises under the direction of a speech therapist for more than four meetings, he was not included in the study. None of the subjects in the study were taken from the group receiving training in the Speech Clinic.

The preliminary selection of the normal group was made by teachers in the University Elementary School and the University High School. They were asked to select students from their classes whom they considered to have the best voice quality. Finally, 20 subjects from this group were selected to match the 20 cleft palate subjects on the basis of chronological age and sex. The subjects were matched within plus or minus three months of their age. The age range for all subjects extended from seven years to nineteen years of age.

Recording of Speech. A recording of a two-minute oral reading performance was made for each of the subjects. The recordings were made on good quality tape recording equipment.[1]

The rating procedure employed by Hixon was utilized in this study. Sixteen members of the Speech Clinic Staff and advanced students in Speech Pathology, all of whom had training and experience in rating voice characteristics, were asked to rate these recordings with respect to two attributes: (1) degree of nasality, and (2) over-all excellence of voice. Each attribute was rated on a 7-point scale of the equal appearing interval type (*4*) to obtain an estimate of reliability of the ratings obtained by this procedure. A method of statistical analysis recommended by Guilford (*4*) was employed. The reliability for the rating of the nasality turned out to be .934. A full discussion of this nasality rating will appear in a later article.

Apparatus and Procedure for Obtaining X-rays. The Higley Head Positioner was used. This apparatus controls the head position in the sagittal plane by means of ear rods inserted into the external auditory meati. A rod placed against the forehead of the subject was used in an attempt to prevent rotation of the head position around this axis. Besides controlling the head position, the apparatus has the further advantage of clearly defining the Frankfort line on the X-ray film. As in Hixon's procedure, each subject was seated in a comfortable position in order not to disturb the habitual carriage of the structures. The relative position of the chair with respect to the head positioner was adjusted to make possible this comfortable posture.

A lead focusing plate was used to obtain good definition of the soft tissues. The marking procedure was as follows: For the cleft palate group, a mixture of barium and 20% gum acacia was painted on the mid-line of the tongue, the mid-line of the velum and hard palate, and the mid-line of the posterior pharyngeal wall covering the area of Passavant's pad. Identical markings of the tongue, hard palate, and velum were used for the control group. It proved to be impossible to mark the posterior wall of the pharynx in the control subjects, however, because of severe gagging. Despite the lack of marking, however, reasonably good definition of these structures was obtained. The exposure varied with the age and develop-

[1] Magnecord PT-6 JA

ment of the subjects; the older subjects (15 to 19 years) were exposed for three seconds at each position. For the younger subjects (7 to 14 years) having less dense and massive structures, a two-and-one-half second exposure was found to be sufficient.

The following X-ray exposures were made. One film was exposed with the subject's mouth in a physiological rest position, i.e., the mandibular teeth slightly separate from the maxillary teeth—the position the jaws assume when at rest. The vowels [ɑ], [æ], [i], and [u] were used in this study. These were the same vowels studied by Hixon. These vowels include front, back, high, and low tongue positions. A sixth exposure was that of an antero-posterior

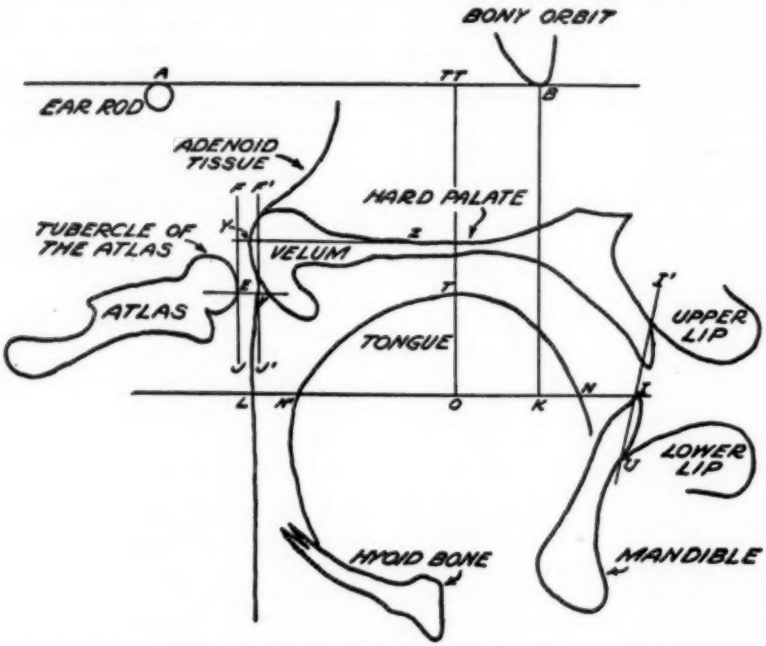

Figure 1. Master tracing showing reference points and location of measurements.

A-B	Frankfort line
Y-Z	Extension of superior surface of hard palate
E-V	Tubercle of Atlas to anterior bulge of posterior pharyngeal wall
N-N'	Antero-posterior diameter of tongue
L-N'	Diameter of pharynx on incisor reference line
P-T	Palate to high point of tongue
T-O	High point of tongue to incisor reference line
I-U	Anterior closure of oral cavity
F-J	Tangent to tubercle of Atlas
F'-J'	Tangent to most anterior bulge of posterior pharyngeal wall
L-I	Incisor reference line
N'-T-N-O	Total midsagittal area of tongue above incisor line
T-N-O	Anterior midsagittal area of tongue above incisor line

TABLE 1. Measurements of the maxilla, mandible and oral cavity at rest. All values in millimeters.

	Normal		*Cleft Palate*		*Difference*	
Maxilla length	*M*	48.13	*M*	42.06	*M*	6.07
	SD	2.84	*SD*	4.95	*SE*	1.56
					*t**	3.89
Maxilla width	*M*	60.47	*M*	55.29	*M*	5.18
	SD	4.97	*SD*	6.19	*SE*	1.52
					t	3.40
Mandible length	*M*	81.72	*M*	76.96	*M*	4.76
	SD	7.84	*SD*	7.42	*SE*	1.65
					t	2.88
Mandible width	*M*	91.40	*M*	93.62	*M*	2.22
	SD	8.63	*SD*	11.96	*SE*	2.52
					t	.88
Length of the oral cavity on the incisal reference line	*M*	82.89	*M*	73.54	*M*	9.35
	SD	3.67	*SD*	3.77	*SE*	2.21
					t	4.23

*$t(df=19)$: 0.1% = 3.88; 1.0% = 2.86; 5.0% = 2.09

view to enable the experimenter to secure lateral measures of the skeletal structures of the face.

The Frankfort line, determined by the most inferior margin of the bony orbit and the superior surface of the ear rod, was used as a base line for the construction of all perpendiculars and parallels used in measuring. The most anterior projections of the tubercle of the Atlas were also used as a reference point for measurement of the pharyngeal wall movement. Figure 1 is a master tracing showing the reference points and location of measurements.

All measurements of tongue area were obtained in square inches by means of a planimeter. The outline of the structure was traced three times and the average of the three measurements was recorded.

Results

Facial and Oral Cavity Dimensions. It is to be expected that individuals with repaired clefts of the palate and repaired clefts of the lip will frequently exhibit extreme deviations of the facial structures. A considerable amount of evidence exists to show that cleft palate and cleft lip surgery often tends to retard the growth centers concerned with the fronto-maxillary, zygomatico-temporal, zygomatico-maxillary, and pterygo-palatine sutures (*3*). Hence, one of the first important considerations of this study is a comparison of the development of the facial structures of the cleft palate group with those of normally structured subjects.

Table 1 presents the data dealing with the skeletal measurements of the maxilla and the mandible. The statistical analysis of this and later tables is identical. For each set of measurements, arithmetic means and standard deviations have been computed separately for the two groups of subjects. These are followed in the table by the difference in the means, the standard errors of these differences and the values of Student's *t*-statistic. Each measurement for a cleft subject was paired with the corresponding measurement for the normal subject that had been selected to match that

cleft palate subject on the basis of sex and chronological age. Each table also shows the values for *t* which are required for statistical significance in the 0.1 per cent, 1.0 per cent, and 5.0 per cent levels of confidence.

Comparisons between the two groups with respect to maxillary size yields results that would be expected. With respect to both width and length, the means for the cleft palate group are smaller than for the normal group. There is approximately 4.5 millimeters difference in width between the average of the two groups; the mean differences in the antero-posterior length of the hard palate was found to be 6.0 millimeters. Both of these differences are highly significant statistically.

The differences between the groups regarding the width of the mandible is not significant. The data for mandibular length, however, showed the average length of the mandibles of the cleft palate group to be shorter by nearly five millimeters than the mandibles of the normal subjects. The *t* for this difference is significant at the 1.0 per cent level of confidence. This finding is also according to expectation in view of the fact that each subject had a repaired cleft of the upper lip. Although it may not be immediately apparent why surgery of the upper lip will restrict growth of the lower jaw, such an effect is to be expected, when one considers the arrangement of the muscle fibers in this region. That is, the obicularis oris muscle has been repaired on the upper lip which probably results in a general shortening of the fibers of this muscle band. As this muscle encircles the mouth and the fibers are continuous throughout both lips, shortening of the fibers in the region of the upper lip may not only put pressure on the upper jaw, but may also result in increased pressure on the anterior area of the mandible.

Considering the over-all under development of the skeletal structures of the face, particularly in the antero-posterior direction, one would certainly expect that the length of the oral cavity should also differ between the cleft palate and normal groups.

The last set of measurements in Table 1 shows that there is a difference in oral cavity measurements that is significant beyond the 0.1 per cent level of confidence. The cleft palate group has the shorter dimensions within an approximate 8.5 millimeter average difference.

Tongue Area. One additional measurement was made which also reflects the under development of the facial and oral cavity structures. This is the measurement of tongue area as shown in Item 1, Table 2. The measurement of the total tongue area above the incisal line in the rest position in the cleft palate group was considerably smaller and statistically significant. That this result is not an accident of the lower carriage of the tongue at rest by the cleft palate group is shown by the data for tongue area during vowel phonation. (Item 1, Table 2)

Antero-posterior Tongue Position. Table 2 contains the data dealing with the absolute measurements of the horizontal tongue position. These measurements are comparable to those made by Hixon (*6*). The results obtained in this study are, however, in the opposite direction from those reported by Hixon concerning his normally structured nasal group. As may be recalled, Hixon found his nasal group had a *tendency* to carry the tongue farther back in the oral cavity. Absolute measurements in this

study indicate that the cleft palate group carried the tongue farther forward in the oral cavity with the exception of the rest and [æ] positions. (Item 3, Table 2)

The distance of the high point of the tongue from the lower incisors is smaller for the cleft palate group at a statistically significant level. The measurements of the tongue area anterior to the high point of the tongue shown in Item 2 are, in general,

TABLE 2. Measurements related to tongue size and the horizontal position of the tongue on the incisal reference line.

		Rest	[ɑ]	[æ]	[i]	[u]
Total tongue area above the incisal line in square inches	*Normal*					
	M	1.40	1.71	1.90	1.48	1.59
	SD	.53	.49	.60	.58	.45
	Cleft Palate					
	M	.90	1.29	1.27	1.18	1.02
	SD	.40	.69	.54	.51	.36
	Difference					
	M	.50	.42	.63	.30	.57
	SE	.16	.18	.42	.49	.08
	*t**	3.05	2.26	1.53	.63	7.12
Tongue area anterior to the high-point of the tongue in square inches	*Normal*					
	M	.71	.99	.97	.78	.84
	SD	2.76	.36	.40	.24	.24
	Cleft Palate					
	M	.42	.64	.62	.65	.52
	SD	.04	.34	.40	.32	.20
	Difference					
	M	.29	.35	.35	.13	.32
	SE	.02	.12	.14	.09	.05
	t	1.19	3.16	2.51	1.39	7.20
High-point of the tongue from the lower incisors on the incisal line in millimeters	*Normal*					
	M	40.04	49.21	34.11	34.64	42.19
	SD	3.29	7.14	6.39	3.45	7.29
	Cleft Palate					
	M	36.82	44.18	32.79	28.35	36.82
	SD	6.13	7.77	5.51	7.97	8.03
	Difference					
	M	3.22	5.03	1.32	6.29	5.37
	SE	1.58	2.33	1.92	2.11	2.41
	t	2.03	2.15	.687	2.98	2.22
Tongue length on the incisal reference line	*Normal*					
	M	60.17	60.98	60.20	52.89	54.00
	SD	5.18	3.43	7.22	7.35	4.33
	Cleft Palate					
	M	50.20	52.01	54.23	45.13	46.70
	SD	12.98	8.80	5.66	6.05	7.13
	Difference					
	M	9.97	8.97	5.97	7.76	7.30
	SE	3.49	2.23	2.14	2.27	1.85
	t	2.85	4.02	2.78	3.41	3.94

*t ($df = 19$): 0.1% = 3.88; 1.0% = 2.86; 5.0% = 2.09.

TABLE 3. Proportional measurements of the horizontal position of the tongue on the incisal reference line.

		Rest	[ɑ]	[æ]	[i]	[u]
Anterior tongue area. (Tongue area anterior to the high-point of the tongue divided by the total tongue area.)	*Normal*					
	M	.506	.579	.490	.556	.549
	SD	.125	.142	.028	.026	.517
	Cleft Palate					
	M	.485	.524	.486	.537	.504
	SD	.178	.151	.142	.230	.159
	Difference					
	M	.021	.055	.003	.019	.045
	SE	.043	.079	.033	.489	.031
	*t**	.488	.693	.021	.038	1.451
High-point of tongue from the anterior oral cavity divided by the total length of the oral cavity	*Normal*					
	M	.483	.585	.440	.420	.495
	SD	.553	.260	.101	.014	.023
	Cleft Palate					
	M	.500	.593	.434	378	.480
	SD	.078	.121	.106	.106	.108
	Difference					
	M	−.017	.007	−.006	.041	.015
	SE	.017	.030	.032	.027	.030
	t	1.000	.233	.187	1.518	.500

*$t(df = 19)$: 0.1% = 3.88; 1.0% = 2.86; 5.0% = 2.09

smaller for the cleft palate group, and, except for the rest position and the vowel [i] the *t* values for these differences are statistically significant. This comparison would seem to contradict the statement just made considering the more anterior carriage of the tongue by the cleft palate subjects. The fact is, however, that these absolute measurements may be somewhat misleading in view of the over-all structural differences between the two groups. As previously discussed, the oral cavity length for the cleft palate group is significantly smaller. It may well be, therefore, that the smaller distance of the high point of the tongue from the anterior teeth and the smaller tongue area anterior to the high point of the tongue found for the cleft palate group are accounted for entirely by these disparities in over-all facial and oral cavity dimensions.

Perhaps a better comparison of the tongue position may be obtained by expressing the measurements in Items 2 and 3 of Table 2 as proportions of the appropriate measurements of the over-all structural size of the tongue. For example, a cleft palate subject may present a measurement of the high point of the tongue from the anterior teeth in the mandible of 10 millimeters; the normal subject with whom he is matched may present a value for this measurement of 15 millimeters. Assume the cleft palate subject to have an oral cavity length of 40 millimeters, whereas, the normal subject has an oral cavity length of 60 millimeters. In this hypothetical case, there is a 20 millimeter difference between the subjects in the oral cavity measurement and a 5 millimeter difference between the subjects concerning the distance of high point of the tongue from the anterior

teeth. When one divides the distance of the high point of the tongue from the anterior teeth by the measurement of oral cavity length, however, the resulting proportional measurement is the same for both subjects, i.e., .25. Proportionately then, when the differences in oral cavity size are taken into account, both the normal and the cleft palate subjects appear to be carrying the tongue in the same relative position.

Accordingly, the measures of Items 2 and 3 in Table 2 were expressed as proportions of structural size measurements. These proportional measurements are presented in Table 3.

It was noted that when the measurement of anterior tongue area is expressed as a proportion of the total tongue area, the measure for the two groups appears to be quite similar. Item 2, Table 3, contains the proportional measurements concerning the location of the high point of the tongue within the oral cavity. Again, when allowance is made for discrepancies in over-all structural size, the differences between the groups with respect to the position of the high point of the tongue in the oral cavity may be seen to be small and short of statistical significance. The largest difference occurs for the [i] position. This is not statistically significant, however.

As in previous measurements, only small and insignificant differences were observed between the groups regarding the length of the tongue on the incisal reference line.

Still another indication of how far anteriorly or posteriorly the tongue is carried is the distance between the posterior pharyngeal wall and the posterior surface of the tongue. If the tongue is retracted, this distance tends to be decreased and, conversely, if the tongue is carried well forward the distance tends to be larger.

Two sets of measurements concerning pharyngeal openings were obtained: (1) the distance on the incisal reference line between the posterior pharyngeal wall and the most posterior portion of the tongue on the incisal line, and (2) the smallest opening between the posterior surface of the tongue and the posterior pharyngeal wall below the incisal line and above the superior cornu of the hyoid bone. It was noted again that no significant differences between the two groups were found for these measures. For both of the openings in question, the differences were observed to be small and variable in direction. In fact, for the rest position and for the vowels [æ] and [i] the cleft palate group was found to have the larger average opening.

In summary of the measurements concerned with tongue carriage, it may be stated that differences in tongue carriage were found when no account was taken of the differences in structural size between the two groups; however, when the measurements were expressed so as to allow for the disparities in structure, only small differences were found between the two groups for (1) location of the high point of the tongue within the oral cavity, (2) proportion of the tongue area lying anterior to the high point of the tongue, (3) tongue length on the incisal line, (4) pharyngeal opening in the incisal line, and (5) smallest pharyngeal opening below the incisal line. None of the differences found for these measurements was large enough, compared to their standard errors, to be considered statistically significant, either for the rest position or for any of the four

vowels. The present data, therefore, do not provide evidence that the cleft palate group habitually employ tongue positions which differ markedly from those found for normal subjects. In particular, there is no evidence that the cleft palate group tends to employ a retracted tongue position as the data from Hixon's study (*6*) indicate may be true for individuals having nasal voices, but normal oral and pharyngeal structures. [2]

Vertical Tongue Position. Hixon (*6*) found in his X-ray study of normally structured subjects that the tongue height above the incisal reference line tended to be greater for his nasal subjects than for the non-nasal subjects. The data in this study shows the reverse to be true for the cleft palate group compared to the control subjects. For the rest position and for all vowels, the tongue height above the incisal reference line was found to be less for the cleft palate group than for the normal subjects. Each of these differences is statistically significant. These differences, however, like the differences in the absolute measurement of the horizontal tongue positions, may be accounted for by the over-all differences in structural dimensions. No measure by means of which the two groups could be compared with respect to the cross-sectional area of the oral cavity could be obtained from the X-ray photographs because of the deviations in palatal structures of the cleft palate group.

The measurements between the high point of the tongue and the palate yield statistically significant differences at rest and for the vowels [æ] and [u] with the cleft palate group presenting the lower tongue position. For the vowels [ɑ] and [i] the differences between the two groups appear to be negligible.

This measurement of distance from the high point of the tongue to the palate would seem, perhaps, to be the most meaningful of the two measures concerning tongue height in relation to the hypothesis that the tongue position is possibly related to the degree of nasalization of vowels in cleft palate speech. If restriction of this channel is presumed to be a factor in nasalization of the vowels, then the average distance from tongue to palate should turn out to be smaller for the cleft palate group.

It is apparent, however, that in this study the cleft palate subjects tend, on the contrary, to present measurements of tongue height, which are either highly similar to the corresponding measurements for the normally structured or which show the tongue to be even lower with respect to the palate than for the normal group.

Excursion of the Tongue From Rest to Vowel Position. Some information may be gleaned from these data relative to the hypothesis that a contributing factor to the nasalization of vowels by cleft palate individuals is a tendency to employ a retracted tongue position for the production

[2] It should be noted here, however, that the findings should not be considered as final when considering retraining of cleft palate speech. Dr. Eugene T. McDonald, Pennsylvania State College, reports to the author that he is in the process of making a similar X-ray study using different measurement techniques and different reference points for measurements. He has thus far found with his measurements that the cleft palate group shows a tendency to carry the tongue in a retracted position. His study tends to agree with this study, however, regarding the height of the tongue carriage in the oral cavity. That is, the cleft palate group tends to carry the tongue lower in the oral cavity than does the normal group.

of vowel sounds. With the single exception of the vowel [æ] the differences are in the opposite direction from that which would be predicted by this hypothesis. It is noted that both groups showed a like movement in the posterior direction for the vowels [ɑ] and [u]. This posterior shift of the high point of the tongue, however, was less for the cleft palate group than for the normals. For [i] an anterior shift in the high point of the tongue was found for both groups, but the anterior movement was found to be larger for the cleft palate subjects. For none of these three vowels, then, is there any indication that the tongue movement in the horizontal plane of the cleft palate subjects is in the direction of a disproportionately larger posterior movement or a disproportionately smaller anterior movement. In fact, the indications are that whatever tendency exists, it is in the opposite direction.

Lip and Mouth Opening During Phonation. Data concerning lip and mouth opening during phonation were also collected. Since all of the cleft palate subjects had repaired clefts of the lip, and since this surgery tends to produce a tight upper lip and a flaccid lower lip, one would expect to find that the cleft palate subjects differ considerably from the normal subjects with respect to the amount of lip opening. The data show, however, that the differences in lip and mouth opening between the two groups are not great and lack statistical significance.

Summary and Conclusions

Twenty individuals with complete unilateral clefts of the palate and lip which had been repaired surgically were used as the experimental group in this study. To be included in the study, subjects were also required to be above borderline in intelligence and to have essentially normal hearing. Twenty normally structured subjects who met the intelligence and hearing criteria were paired according to chronological age and sex with the 20 cleft palate subjects. The age range in the study was from seven years of age to nineteen years of age.

For each individual in the two groups thus selected, five standardized lateral X-rays were obtained: one lateral X-ray for the physiological rest position and one during the phonation of each of the four vowels: [ɑ], [æ], [i], [u]. One antero-posterior X-ray was obtained for the purpose of investigating structural differences of the face. Measurements from the X-ray films were analyzed statistically.

The following conclusions may be drawn from the data:

1. The over-all vertical and antero-posterior dimensions of the face are significantly different for the two groups. The antero-posterior and lateral measurements of the maxilla in the cleft palate group are smaller than those of the normal group. The antero-posterior length of the mandible is shorter in the cleft palate group as is the over-all length of the oral cavity. These results tend to confirm the results reported by Graber (*3*), to the effect that repaired cleft palates as a group show a deficient pattern of maxillary growth. Both the present results and those of Graber also indicate that there is a lack of antero-posterior mandibular development in the cleft palate group. The lack of development found for the present group, all of whom had undergone surgery to repair the palate and lip, gives further support to

Graber's contention that such surgery tends to interfere with the growth centers and adds weight to his argument that such surgery should be postponed as long as possible.

2. The mid-sagittal measurements of the tongue above the incisal line are smaller for the cleft palate group than for the normal group with the mean difference in tongue area amounting to .49 of a square inch.

3. The mid-sagittal diameters of the pharynx at the level of the incisal reference line and below the incisal line are similar for both groups for all positions.

4. In considering tongue retraction in the oral cavity, the horizontal positions of the high point of the tongue were similar for both groups at rest and for all four vowels when the structural differences were taken into account, although absolute linear measurements revealed differences between the two groups due to the smaller facial and oral dimensions of the cleft palate group.

5. With respect to tongue height in the oral cavity, the vertical distance of the tongue from the palate tends to be greater for the cleft palate group. This distance is significant on the rest, [æ] and [u] positions, that is, the tongue is apparently carried lower in the oral cavity in the cleft palate group. This may be the result of a habit pattern initiated during the periods of palatal repair. That is, the patient may have attempted to avoid tongue contact with the palate, thus avoiding pain stimulus during recovery from surgery.

6. For the sustained vowels, at least, there is not evidence to support the belief of many of the authors that insufficient mouth opening it related to nasality in the cleft palate individual.

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A Study Of Word Approximations In The Spontaneous Speech Of Infants

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TWO GENERAL problems are investigated in this study. One is to determine the number and nature of word approximations used by infants in their spontaneous speech during the 10th and 11th age levels. An age level consists of a two-month period. The first age level includes the first and second months. Thus, the 10th age level consists of the nineteenth and twentieth months, and the 11th age level includes the twenty-first and twenty-second months. The other problem is to determine the reliability of the observer in recording the approximations.

A word approximation is defined as a phonetic pattern which is interpreted by the observers at the time of the transcription as an attempt by the infant to pronounce a standard word. The word approximation is further delimited as a phonetic pattern in which one or more of the phonetic elements of the standard word, either vowel or consonantal elements, are present. This means that some elements of the standard pattern are omitted, and other elements are substituted or added.

A standard word is defined in terms of its phonetic listing in Kenyon and Knott's *Pronouncing Dictionary of American English* (5). The phonetic elements are those listed in the International Phonetic Alphabet. The broad transcription used by Fairbanks (*1*) has been employed in this study.

The general problems as stated have been broken down into several specific problems about which information is needed. These are:

1. What is the meaning-reliability[1] of observer transcriptions?
2. What is the mean number of standard words, of correctly pronounced standard words, and of approximations to the standard per individual?
3. What is the mean number of *different* standard words, of correctly pronounced *different* standard words, and of *different* approximations to the standard word per individual?
4. What differences appear between the 10th and 11th age levels with respect to number and sex?

This study is not directly comparable to the conventional studies on the vocabulary of children for these age levels since these data were collected from the subjects as the spontaneous vocalizations without any attempt on the part of the observer to elicit a re-

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[1] The term *meaning* is used consistently in this article to refer to what the observer considers the referent of the verbalization to be—not what the word means subjectively to the child.

sponse by means of a vocabulary test. The method of recording spontaneous vocalizations, however, provides another index of the spoken vocabulary. The records were intended, therefore, to be used rather as a measure of spontaneous word approximations than as a conventional measure of vocabulary.

McCarthy (*6*) states that the mean length of sentence is the most reliable measure of language development of children. This measure, however, does not take into consideration the repetitions of the same word pattern; therefore, it is possible that there may be some confusion between development as such and fluency of use of words. The method employed here attempts to take this variable into consideration by distinguishing between two measures of language development, namely, type and frequency, which will be defined in a later section. This method also meets the other criteria which McCarthy explains as being met by the mean length of the sentence. These are easy determination, objectivity, quantitativity, and clarity. McCarthy finds, using the mean length of sentence, that girls are verbally superior to boys. She does not, however, apply a significance test to the differences at the age levels under discussion. One could assume that the diferences are not statistically significant because the differences are all less than one point. That is, the differences which she found between boys and girls are fractions of one.

Williams (*9*) included in his study an analysis of observer reliability in word usage by the child. The ages of the children studied were somewhat higher than those in this study, but the observer agreement was comparable. For word usage, Williams obtained on 150 items an agreement of 88 per cent. He considers the International Phonetic Alphabet and the transcription of speech a useful tool for the study of word distortions made by the child.

With respect to methodology it is necessary that the relationship between this study and the earlier work by Irwin (*3, 4*) in non-meaningful speech be clarified. The earlier studies developed a methodology which proved useful in the present study. The concepts of *frequency* and *type* which are used here were derived from this earlier work. It will be obvious to the reader that the foundation work in methodology has led to a more useful and reliable index for research pertaining to the word development of the child.

Subjects

The data which are analyzed in this study have been gathered on two separate groups of infants. One group served as subjects to determine the meaning reliability of words. The other group served as subjects to furnish information concerning the number and nature of word approximations.

Four infants were used to determine the meaning-reliability of the word approximations. There were three boys and one girl. The data consist of words carried on 120 respirations for each infant, the total number of breaths for the sample being 480 involving 629 independent judgements by each of the two observers. The subjects of this sample are somewhat older than the other group of subjects.

The data for the second part of the study were on file at the Iowa Child Welfare Research Station and were gathered on 26 infants, records having been taken from these infants

at the 10th and 11th age levels. The infants were visited in their homes and records of spontaneous vocalizations were made in this situation. This group consisted of 14 boys and 12 girls.

Methodology

The method of collecting these data has been described elsewhere (*3*, *4*, 7). Briefly, it is as follows: Of the two methods available for sampling speech sounds—the time sample and the behavior-unit sample—the former has been found to be unreliable (*3*). The latter as used in the present study was developed by Irwin and his associates. It consists of simply recording the sound elements made on each of 30 respirations. It must be pointed out, again, that the observer in no way attempts to get responses; the sounds are the spontaneous vocalizations of the infant.

Spiker (*8*) recently made an analysis of observer reliability in the recording of phonemes in terms of the International Phonetic Alphabet with the above method as developed by Irwin and his students. The per cent agreement obtained by Spiker was 91 per cent.

A different problem in reliability confronts the investigator who is interested in the meaning of the verbalizations. How do we know that the infant who used approximations attempted to verbalize the standard word pattern? A solution to the problem is by means of the method of observer agreement. If observers interpret reliably what the referents of the approximations are, then, and only then, are we justified in assigning meaning to the approximations in terms of the standard word patterns. It might be argued that the observers could agree on a particular word, yet it is still not what the infant meant the approximation to be. That is, the observers agree on the wrong referent to the approximation. We can only answer that it is mere speculation to argue about something we probably cannot know.

Two observers, already trained in phonetic transcription, independently assigned meaning to the approximations at the time the transcriptions were made in the home setting. The sample for the observer-reliability part of this study was collected using four subjects in the following situation:

1. Each subject was visited in his home by the two observers who recorded simultaneously and independently the sounds uttered spontaneously on 120 respirations by the infant. This record was made in terms of the International Phonetic Alphabet.

2. Each observer wrote beside the phonetic transcription the standard word which, in his opinion, was approximated. This recording was made at the time of recording the phonetic elements.

This made a compilation of the sounds carried on 480 respirations for the total sample of four subjects. The analysis of the records of the two observers was in terms of agreements and disagreements reported as percentage of agreements for each record (*i.e.*, the individual subject).

Festinger (*2*) recommends the following formula for cases in which there are obviously two types of disagreements in the data; both observers recording the item in different categories (in this case assigning different meanings to the sounds transcribed) or one observer recording the item and the other observer leaving it out completely (one observer rates the vocalizations as non-meaningful):

$$\frac{\text{Sum of Agreements times 100}}{\text{Sum of Agreements plus } \tfrac{1}{2} \text{ the Sum of Disagreements plus the Sum of Omissions.}}$$

This formula is to be used where the two cases (disagreements and omissions) can be completely and accurately distinguished. If this were not the case, one would be compelled to use the number of agreements plus the number of disagreements as the denominator. According to Festinger (2) this recourse would result in an underestimation of the per cent agreement which '. . . would no more than compensate for the not quite valid assumption that allocations by the two observers to the same category refer to the same observer items.'

The analysis of the words is in terms of the correctly used standard words, the approximations to the standard words, and the total attempted standard words. Six indices have been used and applied appropriately to the subdivisions as stated. The indices are briefly described as follows:

Type Correct: The number of different word patterns correctly pronounced by the individual.

Type Approximated: The number of different approximations verbalized by the individual.

Type Attempted: The summation of the type correct and type approximated.

Frequency Correct: The number of word patterns correctly pronounced in the record of the subject.

Frequency Approximated: The number of approximations in the record of the individual.

Frequency Attempted: The summation of the frequency correct and the frequency approximated.

It should be noted that the distinction between *type* and *frequency* is that type refers to different word patterns, while frequency refers to total number for the individual without regard to duplication of type. An infant who verbalizes a particular word approximation several times within an age level would receive a type count of one, but he would receive a frequency count equal to the number of productions of the word pattern or type.

Results

The results of the observer-reliability part of this study reveal that the over-all agreement according to Festinger's formula is 91 per cent. There were 555 agreements, 37 disagreements and 37 omissions in the data. The range when the individual subject is considered was from 87 to 94 per cent agreement which would indicate that the results reported are consistent. The value of 91 indicates that it is possible to achieve quite high meaning-reliability as defined in this study.

The data for the second part of the investigation are found in Table 1. In order to determine the significance of the differences between the two age levels, the method of related samples has been employed. The *t*-test

TABLE 1. Means and standard deviations for words correct, approximated, and attempted, both as to type and as to frequency, for age levels 10 and 11. (N=26)

	Correct	*Approximated*	*Attempted*
Type			
Age Level 10			
Mean	1.192	2.192	3.384
SD	1.687	3.000	3.628
Age Level 11			
Mean	2.000	4.269	6.269
SD	2.038	3.205	4.609
Frequency			
Age Level 10			
Mean	1.576	2.538	4.115
SD	2.452	3.354	4.182
Age Level 11			
Mean	2.730	5.432	8.153
SD	2.876	4.134	6.094

using the standard error of the difference as a measure of significance is appropriate. This method is necessary because the subjects were the same individuals at both age levels, therefore, one subject is compared with himself at the 10th and 11th age levels. The 1 per cent coefficient of risk is adopted for the statistical test of significance. Since we are only interested in (and expect) differences in the upper region of the curve (*i.e.*, larger values at the 11th than at the 10th age level), a one-tailed test of significance is used. This means that the tabled probabilities must be halved. In this case where the degrees of freedom are 25, t must be equal to or greater than 2.485 in order to be regarded as significant. This figure was taken from the 2 per cent column in the t table in order that a 1 per cent coefficient of risk be established.

It was found that the increases in number of words correctly used by the infants from the 10th to the 11th age level were not statistically significant. This result holds on both the type and the frequency criteria. Increments in word approximations between the two age levels were found to be statistically significant, however, and this was the case in both type and frequency. The increases in words attempted were significant at the 1 per cent level of confidence.

A final comparison as to sex differences for type and frequency *attempted* was made. The results are in terms of the sample of 14 boys and 12 girls. Since an analysis of the results revealed that there is homogeneity of variance between the boys and girls, a t-test was calculated. The analysis revealed no significant differences between the means for boys and girls when the type and frequency of words attempted are considered.

Discussion

The method of training the observer in the techniques of sampling the speech of infants is a basic condition of sound research dealing with language development. In the present study it was necessary first to establish that the observers were proficient in the use of the International Phonetic Alphabet. Then the two observers practiced assigning standard words to the transcribed speech. This was done simultaneously and independently and was carried out at the time of making the transcriptions. The results could then be compared and the degree of agreement determined.

The observer reliability obtained in the present study using the method described above and employing Festinger's formula was 91 per cent for the total sample of four subjects. This finding is comparable to those of other investigators who have participated in the speech development work. It will be recalled that Williams (*9*) reported a reliability value of 88.

From an inspection of the means and standard deviations for the indices, it is apparent that the type and frequency of words attempted yield greater increments than do the type and frequency of approximations and correct words. That is, there is a greater mean increase from the 10th to the 11th age levels in words attempted than in words approximated and words correct.

The indices of type and frequency correct are not significantly different at the 10th and 11th age levels. This means that there is no dependable increase in the number of correct pronunciations from the 10th to the 11th age levels, although the increase was in the predicted direction. The other two indices, on the contrary, are significant at the 1 per cent level of confidence.

It is reasonable to assume then that the significant differences found with the attempted indices are related to the increases in the *approximations* indices. This implies that the differences are not due to any increase in correctness of speech from the 10th to the 11th age level when correctness is defined in terms of the standard pronunciation. The differences may be characterized as an increase in the number of words attempted without any observable changes in the correctness of the word used in speech. This does not rule out the possibility of an increase in terms of more nearly correct. There may have been a trend from a less-correct approximation to a more-correct approximation. This possibility was not analyzed in this study.

The fact that there is a reliable increase in the number of words attempted from the 10th to the 11th age level, but that there is no statistically reliable increase in correctness is a very meaningful relationship. It suggests that word approximations are a normal aspect of the development of the vocabulary of the individual. More complete data elucidating this hypothesis will be published in a forthcoming article.

Next comes the question as to the implication which can be formulated and applied to the individual. One can reason that the important thing is that the speech environment of the child be sufficiently stimulating and free from anything which would prevent him from attempting standard words in the form of approximations. That words are distorted when they first appear is a normal stage in the infant's speech development and may even be regarded as a necessary prerequisite to the development of the vocabulary.

The results of this study show that there were no sex differences which could be regarded as statistically significant. This is inconsistent with the results reported in McCarthy (*6*). The differences in the methodology between this study and the ones reported by McCarthy must, again, be taken into consideration. There is no *a priori* reason why we would expect sex differences in the spontaneous use of words at these ages. It remains for future researches in the word development of children to determine just when the sex differences come into the situation. The hypothesis that at the 10th and 11th age levels there are no sex differences in the number of spontaneously-attempted words remains tenable.

Summary

This study is concerned with an analysis of word approximations used by infants during the 10th and 11th age levels. Two problems are considered: (1) Observer-reliability of meaning of the word approximations used by infants, and (2) The number and nature of word approximations used by infants during the 10th and 11th age levels.

The method is derived from the work of Irwin and his students on the non-meaningful speech of infants. The units for the study are the breath of the infant, the International Phonetic Alphabet, and the word, a distinction between type and frequency being made. The infant was visited in his home and a record of the spontaneous speech was made by the observer.

Results of the first problem reveal that it is possible to get observer agreement as to the meaning[2] of the

[2] See footnote 1.

vocalizations. The per cent agreement is 91 for the total example.

Results of the second problem indicate that there is a significant increase in the number of approximations from the 10th to the 11th age level and also a significant increase in the number of words attempted. There was no increase in the number of correct pronunciations from one age level to the other. There were no sex differences which were statistically significant.

Some implications for further research in the area of infant speech come from the results reported here. In order to make the findings more generally applicable, the study should be extended to include the whole period of infancy and into early childhood to determine just when the correctness variable does enter into the situation. A breakdown of the populations into the various aspects would make the results more complete. Then, it would be beneficial for further research to take into consideration the various lengths of samples to be compared, and from this, to determine what is the most reliable size of sample for specific purposes. Finally, a comparison of the two indices of *type* and *frequency* should be made so that it would be practical to use one or the other as an index to the speech of infants.

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Perceptive vs Productive Skills In Analyzing Speech Sounds From Words

Raymond Summers

MANY STUDIES are available which measure the incidence of speech, reading and spelling defects (*16, 2, 7*). Educators should be concerned about teaching techniques that will keep the number of defectives in these language skills at a minimum. A phonic[1] approach has been suggested as a method which might be beneficial (*9, 1, 5*).

Purpose

The purpose of this study was to determine the ability of college students to perceive and to analyze and produce isolated speech sounds. The problems studied were:

1. Are some sounds in the English language perceived correctly more frequently than others? Are some analyzed and produced correctly more frequently? Are those sounds that are most frequently perceived correctly also most frequently analyzed and produced correctly and vice versa?
2. Is skill in perception or analysis-production of sounds correlated with: (a) Speech sound discrimination ability? (b) The ability to identify the written letter representing a sound in a word?
3. What individual differences exist in the: (a) Perception of sounds? (b) Analysis and production of sounds?
4. What relation exists between perception and analysis-production skills and: (a) Sex differences? (b) Linguistic skills? (c) Scientific ability? (d) General college aptitude? (e) Speed of comprehension? (f) General reading ability? (g) Vocabulary level? (h) Pronunciation ability? (i) Grade point average?

[1] The words 'phonetics' and 'phonics' are often used interchangably. In this article, 'phonetics' will refer to the science of speech sounds while 'phonics' will refer to the application of phonetics to the teaching of reading and spelling.

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Subjects

One hundred undergraduate students at Indiana University were selected for this study. Twenty-nine were males and 71 were females. The subjects' ages ranged from 17 to 30 with a mean age of 19.98. All subjects had selected teaching as a profession and were enrolled in the required course, Introduction to Teaching.

The following criteria were used for selecting subjects:

1. They were laymen in the area of phonics or phonetics as evidenced by the fact that they were not enrolled in nor had they taken any phonics, phonetics or speech correction courses.
2. They had a speech and hearing examination at the Remedial Speech and Hearing Clinic.
3. They had normal hearing.
4. They were not defective speakers who were receiving speech or hearing therapy.

Tests and Procedure

Four tests were constructed by the examiner. The *perception test* presented a sound orally and then one word which contained the sound—in the initial position whenever possible and never as part of a blend. The subject's answer consisted of one of four

words[2] (from a multiple-choice list) which contained the sound originally presented. Twenty-six consonants and nine vowels were tested.

The sounds which the examiner could not present in isolation [b d g dʒ r] were presented in nonsense syllables using the vowel [ʊ].

Most letters in the English language represent more than one sound and vice versa. This presents opportunity for confusions and these confusions were included in this test in two ways: (1) An attempt was made to include one or more words which contained the letter generally associated with the key sound. These words would appear visually to be correct responses. For instance, the [t] had the following words in the multiple choice answer: listen, whistle, earth and hotel. Although each word contained the *letter* t, only 'hotel' contained the [t] *sound*. (2) An attempt was made to include words for the correct responses which did not contain the letter ordinarily associated with the key sound. For instance, the [k] was tested in the word 'next.' The [w] was tested in the word 'quick.'

In the instructions for the preception test, it was pointed out that there is no relation between the number of *letters* used to spell a word and the number of *sounds* in the word and also that words are frequently spelled with letters that give little or no identification to their pronunciation. Therefore, the subjects were urged to disregard the spelling of the word and to think only of the sounds that made up the word.

The *speech sound discrimination test* used in this experiment was constructed so that the subject had to retain the key sound while he was choosing one of three nonsense syllables which contained the sound. One nonsense syllable was presented which, after a brief pause was followed by three other nonsense syllables—one of which was the same as the original. The subject was to indicate which of the three syllables was like the original.

In constructing this test, the key sound always occurred in the medial position of a syllable. Key consonant sounds always occurred in a syllable beginning and ending with the vowel [ə] and key vowel sounds occurred in a syllable beginning and ending with the consonant [f].

Twenty-six consonants and nine vowels were used as key sounds. When consonants were studied, nonsense syllables in the multiple choice answer contained cognates and other consonants difficult to discriminate (*3*). When vowels were studied the nonsense syllables to be discriminated contained adjacent sounds in the vowel triangle (*10*).

The *sound-letter-association test* was constructed to determine an individual's ability to analyze a sound from a word and to circle one of three letters which represented that sound. Seventeen words were presented.

The instructions for the test pointed out that words frequently have sounds which are not represented by any letter and that sometimes the spelling of a word gives little or no clue to its pronunciation. Therefore, the subjects should pay particular attention to the sounds that make up the word rather that the letters in the spelling.

The *analysis-production test* was designed to determine how well individuals could produce speech sounds in isolation. Two skills were involved if the subject was to produce the cor-

[2] All words used as illustrations or potential answers in the tests constructed by the examiner were selected from Gates' *Reading Vocabulary for the Primary Grades* (*8*).

rect sound: (1) the ability to analyze words into their component sounds and (2) the ability to produce the analyzed speech sounds in isolation. The study was not designed to indicate which ability predominated. It simply measured the subject's ability to produce a sound correctly after he had discriminated it.

Only 23 of the 35 sounds in the language could be tested in all three positions. Forty-one words were presented. The examiner presented a word orally and the subject repeated the word and then gave the isolated sounds that made up that word. The examiner recorded the response phonetically. The instructions for the test pointed out that individuals probably have little difficulty dividing words into syllables but that this was an attempt to determine their ability to divide words into sounds.

Before any of the four tests described above were administered, the examiner read three examples, gave the correct responses to the examples and then allowed the subjects an opportunity to ask questions about procedure before the tests were administered.

The perception test, speech sound discrimination test and sound-letter-association test were administered as a battery of tests along with a vocabulary test. This battery required 50 minutes of a regular class period and the tests were administered in the above order. The analysis-production test was administered individually and required about 25 minutes.

Before the administration of the vocabulary test,[3] it was pointed out that the subjects could have as much time as necessary to complete the test. The subjects underlined one of four words which carried the same meaning as the key word.

The results of a pronunciation test, an articulation test and an individual audiometric sweep check test were taken from a battery of tests given to all students enrolled in Introduction to Teaching. These tests were administered individually by speech and hearing therapists at the Remedial Speech and Hearing Clinic. For the pronunciation test, the students read two paragraphs which contained more than the average number of words that were considered difficult to pronounce. Of 112 words in the two paragraphs, 30 were words that were frequently mispronounced.

Scores from the American Council on Education Psychological Examination for College Freshmen (1946 and 1947 editions) (*12*) and the Cooperative English C2 Test (Form S) (*4*) were obtained either from the Indiana University Testing Bureau or from the student's psychograph in the School of Education.

The last information obtained was the number of credit hours carried and the number of honor points earned by the experimental group during the first semester of the 1950-51 school year. This information was obtained from the Indiana University Counseling office. From the data, grade-point averages were computed for all subjects.

Results

Perception Test. In the perception test, 35 different sounds were presented. Since each sound was presented only once, the highest possible score on the test was 35. The scores ranged from 12 to 35 with a mean of 25.67 and a standard deviation of 5.20. The mean score for the males was 24.79, for the females 26.03. The critical

[3] From the California Test of Mental Maturity, Advanced Series, 1946 revision (*14*).

TABLE 1. Sounds ranked in order of frequency in which each sound was perceived correctly by 100 subjects.

Sound	*f*	*Sound*	*f*	*Sound*	*f*
tʃ	100	p	85	l	67
d	100	ɪ	83	h	65
dʒ	98	z	82	ɑ	60
ɝ	94	j	81	s	60
ɔ	94	ʒ	79	ɛ	56
r	93	ʊ	79	k	54
u	92	ʃ	76	f	49
m	90	æ	76	ð	46
b	89	ʌ	73	θ	41
t	88	n	72	ŋ	23
g	87	hw	68	w	13
i	86	v	68	Total	2567

ratio between the means (1.11) was not significant. It was therefore concluded that there is no difference in the perception ability of the males and females.

Sounds were perceived correctly most frequently when they appeared in the initial position. The medial and final positions followed in order.

Table 1 lists the sounds studied in the order of frequency with which they were perceived correctly and the number of times each sound was perceived correctly. Each sound had a possible score of 100. The only sounds perceived correctly by all subjects were [tʃ] and [d].

In this study, the scores for the vowels ranged from 56 to 94 with a mean of 77.66 and the scores for the consonants ranged from 13 to 100 with a mean of 71.85. The mean score for the total group of sounds was 73.34. The low scores of certain consonants [k f ð θ ŋ w] decreased the mean score for the total group. According to Table 1, the above sounds had lower scores than any of the vowels.

Combining scores for the voiced and the voiceless sounds of the eight cognates in the English language,[4] it was found that the voiced sounds were perceived correctly more frequently than the unvoiced. The mean score of the voiced sounds was 81.12 and the mean score of the voiceless sounds was 69.12.

Fletcher (*6*) compiled a table listing the frequency of occurrence of speech sounds.[5] The mean number of times the most frequently used sounds were correctly perceived was 79.85; for the least frequently used sounds the mean score was 75.8. The critical ratio between the means was .48 which was not statistically significant. The results indicate that the sounds occurring most frequently in our language are not more easily perceived.

The results also indicated that the 10 sounds which had the highest score on the analysis-production test more frequently had high scores on the perception test than the 10 sounds which had lowest scores on the analysis-production test. The mean perception score for the 10 best sounds on the analysis-production test was 80.8 while the mean perception score for the 10 lowest sounds was 58.1. The critical ratio between the means was 2.62 which was significant at the two per cent level.

In order to determine what relation existed between speech sound perception and various other factors, correlations were computed between the factors studied and speech sound perception. Table 2 lists these factors and the correlations obtained. The highest correlations with speech sound

[4] These sounds are [p b]; [t d]; [k g]; [s z]; [ʃ ʒ]; [tʃ dʒ]; [f v]; and [θ ð].

[5] The 10 most frequently used sounds were [ɪ n t r (or ɝ) ʌ s d æ i l]. The 10 least frequently used sounds were [ɔ ŋ ʃ g ʊ j tʃ dʒ θ ʒ].

TABLE 2. Correlations between speech sound perception and other items tested.

Item	*Correlation*
Analysis-production	.607
Age	—.134
Speech sound discrimination	.264
Sound-letter-association	.526
Vocabulary	.357
Pronunciation	.461
Grade point average	.287
ACE — quantitative	.443
ACE — linguistic	.46
ACE — total	.483
C2 — speed of comprehension	.412
C2 — total	.391

perception were with analysis-production and sound-letter-association.

Analysis-Production Test. The results of the analysis-production test were evaluated in the following manner. Every sound the subject said in the word was recorded as a correct or incorrect response. Responses were as follows:

I. *Correct response* was the correct production of the isolated sound except for [b d g dʒ r] in which cases the sound could be accompanied by any vowel.

II. Incorrect responses:

A. *Correct sound combined* with the sound immediately preceding or following it in the word.

B. *Correct sound* was combined with an *added* sound—a sound other than an adjacent sound in the word.

C. *Substituted cognate*—the substitution of the cognate for the sound being examined.

D. *Substituted cognate combined* with the sound immediately preceeding or following it in the word.

E. *Substituted cognate* was combined with an *added* sound—a sound other than an adjacent sound in the word.

F. *Omission*—no sound produced where one should have occurred.

G. *Wrong response*—the sound produced was neither the sound being studied nor its cognate.

The highest possible score on the analysis-production test was 92. The scores ranged from 15 to 85 with a mean of 55.12 and a standard deviation of 15.96. The mean for the males was 53.45 and for the females 55.8. The critical ratio for the difference between the means was .700 which was not significant. The standard error of the mean for the total group was 1.60.

The results show that of the 368 substituted cognates, 367 resulted in the substitution of unvoiced for voiced cognates. This may help to explain the result of the Roe and Milisen study of speech sounds of children (*13*) in which they found that '. . . a large number of errors occurring on [z], [dʒ], [ð], [v], [b], [d] were their voiceless counter parts.'

Table 3 lists the frequency of each type of response made during the analysis-production test for all sounds studied and for the total experimental group. The most frequent error was combining the sound being studied with an adjacent sound. This might be expected because the most natural word unit for laymen is the syllable and not the sound.

The analysis-production test results show that sounds in the final position were easiest to analyze and produce, sounds in the initial position next and sounds in the medial position were hardest.

TABLE 3. Frequency of each type of analysis-production response for all sounds studied for 100 subjects.

Type of Response	*f*
Correct response	5512
Correct sound combined	2097
Correct sound added	784
Substituted cognate	368
Substituted cognate combined	27
Substituted cognate added	33
Omission	129
Wrong response	250
Total	9200

TABLE 4. Sound tested, number of attempts per subject, total number of times each sound was analyzed and produced correctly and mean score for each sound.

Sound Examined	*Number of Attempts Per Subject*	*Total Number of Correct Responses*	*Mean Score*
ɔ	3	270	90
ɝ	3	265	88.3
æ	3	264	88
g	3	259	86.3
u	2	169	84.5
i	3	251	83.6
b	3	243	81
ʃ	3	239	79.6
ʌ	3	232	77.3
θ	3	218	72.6
f	3	218	72.6
m	3	206	68.6
r	2	134	67
s	3	200	66.6
dʒ	3	197	65.6
tʃ	3	186	62
d	3	185	61.6
k	3	181	60.3
t	3	175	58.3
ʊ	1	58	58
l	3	173	57.6
n	3	167	55.6
ɑ	2	103	51.5
p	3	145	48.3
ɪ	3	133	44.3
hw	2	88	44
ɛ	2	82	41
z	2	82	41
v	3	108	36
ʒ	2	70	35
h	2	61	30.5
ŋ	2	49	24.5
ð	3	57	19
w	2	24	12
j	2	20	10
Total	92	5512	

Table 4 lists the rank order of each sound examined beginning with the sound analyzed and produced correctly most frequently. The table also indicates how often each subject attempted the sound, the number of times each sound was analyzed and produced correctly and the mean score for each sound. A perfect mean score for the sound would be 100.

Table 4 shows that four of the sounds most difficult to analyze and produce were the voiced sounds of cognate pairs. These four sounds were [z v ʒ ð]. The voiceless counterparts were all easier to produce.

The 10 most frequently used sounds (*6*) had a mean analysis-production score of 67.05 and the 10 least frequently used sounds had a mean analysis-production score of 58.36. The critical ratio for the difference between the means was .95 which is not significant.

The results also indicated that the 10 sounds which had the highest score on the perception test more frequently had a high score on the analysis-production test than the 10 sounds which had the lowest score on the perception test. The mean analysis-production score for the 10 best sounds on the perception test was 72.69 while the mean perception score for the 10 lowest sounds was 45.06. The critical ratio between the means was 3.57 which was significant at the one per cent level.

Referring to Table 4, some vowel sounds were analyzed and produced correctly quite frequently and some only infrequently. The mean number of times all sounds were analyzed and produced correctly was 59.91. Considered separately, the mean score for the vowels was 71.0 and the mean score for the consonants was 56.43.

To determine what relation existed between analysis-production and other

TABLE 5. Correlations between the analysis-production of speech sounds and other items tested.

Item	*Correlation*
Perception	.607
Age	—.037
Speech sound discrimination	.163
Sound-letter-association	.465
Vocabulary	.336
Pronunciation	.384
Grade point average	.262
ACE — quantitative	.466
ACE — linguistic	.432
ACE — total	.487
C2 — speed of comprehension	.408
C2 — total	.393

factors, correlations were computed. Table 5 lists the factors studied and the correlations obtained. The highest correlations with analysis-production were with speech sound perception and the total ACE score.

Speech Sound Discrimination Test. The highest possible score on the speech sound discrimination test was 35. The scores ranged from 24 to 35 with a median of 34.47. The results of this test indicate that speech sounds are generally easy to discriminate or that this test was not difficult enough to measure speech sound discrimination ability.

The subjects seemed to have difficulty discriminating six sounds. Table 6 lists these six sounds and their rank scores for the perception and analysis-production tests. These sounds were confused three or more times with one other sound. With the exception of [b] and [ɔ], the sounds frequently confused in discrimination were also frequently perceived incorrectly and analyzed and produced incorrectly.

Sound-Letter-Association Test. A score of 17 was possible on the sound-letter-association test. Scores ranged from 10 to 17 with a median of 15.53. These results indicate that the subjects were proficient in associating letters with sounds in words or that the test was not difficult enough to measure the skill involved.

The sounds which caused the most difficulty in associating with a letter were: [r dʒ s w]. Incorrect letters were chosen 61 per cent of the time for the [w], 31 per cent for the [s], 29 per cent for the [dʒ] and 19 per cent for the [r].

Pronunciation Test. Table 7 lists the words studied in the pronunciation test and the frequency of correct responses for each word. The scores on the test ranged from 17 to 30 with a mean of 25.22 and a standard deviation of 3.12. The standard error of the mean was .312.

Conclusions

The conclusions from this experiment were divided into four parts.

I. *What are the characteristics of sounds which are more accurately perceived and more accurately analyzed and produced?*

A. Sounds were perceived accurately most frequently in the initial position in the word.

TABLE 6. Six sounds discriminated incorrectly, rank order on perception test and rank order on analysis-production test.

Sound Discriminated Incorrectly	*Rank Score* on Perception Test*	*Rank Score* on Analysis-Production Test*
b	9	7
ɛ	29	27
ŋ	34	32
ɔ	4	1
h	28	31
v	26	29

* Lowest possible score was 35.

TABLE 7. Words used to check pronunciation and frequency of correct response* for each word for 100 subjects.

Word	*f*
film	100
elms	100
delinquency	99
children	98
municipal	98
sword	98
wrestling	96
length	96
February	96
library	94
influence	94
picture	93
catch	91
accurate	90
partner	87
parochial	86
because	85
experiment	84
statistics	82
theatre	82
recognized	81
athletic	80
genuine	79
overalls	78
athletes	75
government	71
admirable	70
juvenile	67
comparable	38
mischievous	34
Total	2522

* Highest possible score was 100.

B. Vowels were perceived accurately more often than consonants and voiced cognates more often than voiceless.

C. Sounds tended to be analyzed and produced accurately most frequently when they appeared in the final position of the word.

D. Sounds that were perceived accurately most frequently were more easily analyzed and produced and sounds that were perceived accurately least frequently were harder to analyze and produce.

E. No single characteristic of language was isolated by this study which would indicate why a sound was perceived or analyzed and produced accurately frequently or infrequently.

II. *Are individuals who are good at speech sound discrimination and sound-letter-associaiton also good at speech sound perception and/or speech sound analysis and production?*

A. Little difficulty was experienced in discriminating between speech sounds. The sounds which were most difficult to discriminate were also sounds which tended to be difficult to perceive and difficult to analyze and produce.

B. Speech sound discrimination was correlated with speech sound perception but not speech sound analysis-production.

C. Subjects were confused by the nonphonetic character of the language while perceiving sounds and while analyzing and producing sounds.

III. *What individual differences exist in the perception of sounds and the analysis and production of sounds?*

A. Subjects showed a wide range of speech sound perception and analysis-production ability.

B. In analyzing and producing speech sounds, the subjects failed in two out of three attempts.

C. In the analysis-production test the unvoiced cognates were frequently substituted for the voiced ones.

D. When subjects failed to analyze and produce sounds correctly in isolation, the vowels were combined about as often as the consonants. When a sound was added to the one being studied, however, consonants were 'added to' more frequently than vowels.

E. The most frequent type of error in the analysis-production test was to combine the sound being studied with one of the adjacent sounds in the word.

IV. *What relation exists between the perception of speech sounds and the analysis and production of speech sounds and other items studied?*

A. The highest correlation was between the two factors studied—speech sound perception and analysis-production.

B. The following items had low correlations with the two factors:

1. Vocabulary level
2. Pronunciation ability
3. Grade point average
4. ACE — quantitative (scientific ability)
5. ACE — linguistic
6. ACE — total (general college aptitude)
7. C2 — speed of comprehension
8. C2 — total (general reading ability)

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Norms For Maximum Repetitive Rates For Certain Sounds Established With The Sylrater

John V. Irwin
Orville Becklund

ANY POTENTIAL relationships of the maximum rate of certain rapid repetitive movements to speech development, as discussed by West (*15*, *16*), Berry and Eisenson (2), and Van Riper (*14*), have been difficult to evaluate because (a) techniques of measurement have made it impractical for the average clinician to measure such movements and (b) the inaccessibility of uniformly established norms has made difficult adequate interpretation of any measurements attempted. It seemed important, therefore, to develop a primary technique for measuring the rate of certain rapid repetitive movements and to set up norms based on the particular procedures developed.

John V. Irwin (Ph.D., Wisconsin, 1947) is Professor of Speech, University of Wisconsin, and Orville Becklund, now with private industry, was Assistant Professor of Electrical Engineering at the University of Minnesota at the time of this study. Superintendent G. W. Bannerman, Mrs. O. A. Enstad, and Miss Martha Mattson of the Wausau Public Schools, Wausau, Wisconsin, and Dr. Roger Maas, Hearing Consultant for the Wisconsin State Department of Public Health, assisted in the selection of subjects for the investigation. The Computation Service of the University of Wisconsin aided in the preparation of the statistical analyses.

Equipment

Previously devised techniques to study rapid repetitive movements may be conveniently categorized as: (a) mechanically-actuated recording devices, (b) electrically-actuated counters, and (c) electro-acoustical converters.

Mechanically-actuated recorders, such as the stylus to the jaw of Seth (*12*), the bulb against the lip of Blackburn (*3*), or the face mask of Strother and Kriegman (*13*), although accurate, conceivably introduce very real psychological and physiological abnormalities into the situation. These may, according to Johnson (7), and Ream (*10*), greatly affect the measure. Moreover, the problem still remains of counting and converting such movements to some measure of rate, as movements per second.

Electrically-actuated counters, as described by Fairbanks and Spriestersbach (*5*), in addition to being accurate and dependable, greatly minimize the physiological abnormalities of the situation, and have been successful in such measurements as rate of tongue protrusion, in which the movement is accessible to such study.

Previously used electro-acoustical converters were not primarily de-

signed to measure the rate of movement. Thus, Lundeen (*8*), in a variation of a technique used by Albright (*1*), recorded sounds of diadochokinetic movements at 78 rpm and played these back at 33 rpm, at which reduced speed he was able to count the number of sounds per second. Again, Blomquist (*4*) used recorded samples of sounds resulting from diadochokinetic movements and counted these as they appeared on the acoustic spectograph. Nevertheless, despite the limitations of the particular techniques employed, it may be noted that the electro-acoustic technique possesses certain advantages in a considerable variety of speech research problems. First, there is no physical coupling to the subject and, second, the sound is measured rather than the movement.

In preparation for a program of speech research, the authors have sought an electro-acoustic method of rate measurement that would enable the observer to take a reading simultaneously with the performance of the test. It is believed that a solution to this problem has been reached in the design and construction of a sound pulse rate meter, which, for convenience, will be referred to as the 'sylrater.'

An understanding of the sylrater circuit can be facilitated by a preliminary consideration of the block diagram (Figure 1). Above each of six blocks is the output waveform of the associated block. The wave form initially is that of a low-amplitude syllable or sound pulse followed by a high amplitude sound of longer duration. After the audio signal is amplified, it is rectified and fed into an integrating network, whose d-c output voltage wave resembles the envelope of the rectified audio wave. When this d-c voltage exceeds a fixed level, the one-shot multivibrator is tripped, and it produces a pulse whose shape is quite independent of the wave shape of the controlling voltage. This stage is significant in that it has wiped out all the unique properties of each syllable except its time of occurrence. If the syllable is sustained, the multi-

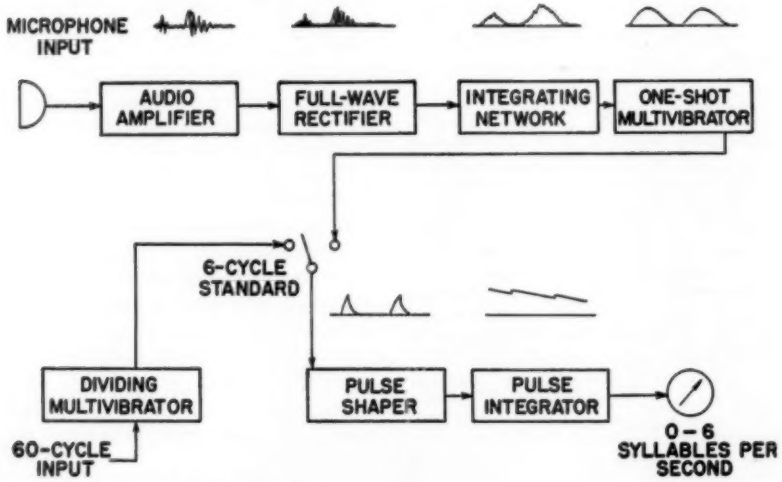

FIGURE 1. Block diagram of sylrater.

vibrator remains tripped with no further output until it is reset by the reduction of the d-c control voltage below the fixed level.

The pulses from the one-shot multivibrator are not of appropriate shape for the final rate circuit; so a two-stage pulse shaper is inserted to produce sharply peaked pulses from the rather flat-topped multivibrator pulses. Each peaked pulse fires a gas tube; and this in turn passes a fixed amount of charge into a large capacitor, the pulse integrator, which is discharged by a parallel resistor. The terminals of a vacuum-tube voltmeter are connected across the large capacitor; and since the capacitor voltage in the portion of the curve used in this application is closely proportional to the number of pulses per second, it is appropriate to mark the vacuum-tube voltmeter scale in syllables per second. The accuracy of the scale, however, was not made dependent upon the linearity of this effect. Instead, the scale distribution is founded upon a large number of calibration points ob-

FIGURE 2. Sylrater chassis.

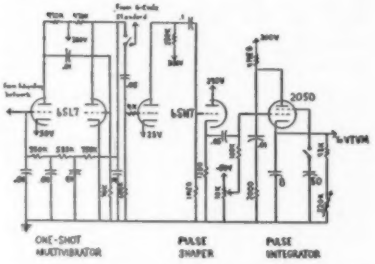

FIGURE 3. Schematic of certain sylrater circuits.

tained through the use of a carefully timed metronome. The tendency toward linearity did facilitate accurate interpolation of other scale points.

It is to be expected that aging of parts, variations in temperature, and other causes will affect the calibration of the sylrater. Hence a calibrating device forms a part of the instrument. This device (involving two three-element tubes) divides the 60-cycle power-line frequency by 10 to give a six-cycle-per-second standard source that can be substituted for the microphone. When the standard source is connected, the operator adjusts the sensitivity of the indicating instrument until it reads 'six syllables per second.' In order to be able to check this dividing process conveniently, an electrically operated mechanical counter is mounted on the sylrater chassis (Figure 2). The reading of this counter can be observed by opening the top door of the sylrater cabinet. The process of checking consists of turning on the counter for a timed interval during which the six-cycle source is connected. The accuracy of this check can be increased to any desired degree by extending the interval of counting.

The circuit peculiarities of the sylrater can be discussed in connection with the circuit diagram (Figure 3), which shows the three less common

stages of the instrument. One comment, however, should be made about one of the circuits that has not been shown. The conventional audio amplifier is equipped with a fixed 'tone control' (a capacitor between plate and ground) to reduce the amplitude of high-frequency components in speech. Without such discrimination, words like 'six' and 'watch,' for example, would be interpreted as representing two syllables rather than one because of the strong final sounds in these words.

The conventional one-shot multivibrator usually has just a resistor connecting the plate of the second tube with the grid of the first tube. In the present application, however, there was still enough of the speech frequencies superimposed on the d-c voltage output of the integrating network to cause trouble when the conventional circuit was used. The pulse is produced when the second tube stops conducting as a result of the changing of the first tube from a non-conducting to a conducting state. During this operation, there is a short interval during which both tubes are conducting and are functioning as a two-stage audio amplifier. As a result, a very small a-c imput to the first stage would cause the output pulse to look very ragged and to depend for its shape on the nature of the syllable. Two things have been done to combat this effect. First, a .01-microfarad capacitor is placed between the plate of the second tube and ground to provide a low-impedance path for the speech frequencies. Second, instead of a simple resistance connection between the plate of the second tube and the grid of the first, a resistance-capacitance ladder network is substituted. The nature of this network is such as to provide the positive feed-back for the pulse voltage (usually provided by the simple resistance connection) and in addition to provide a negative (degenerative) feedback for the lowest speech frequencies.

The output pulses of the one-shot multivibrator are fed to the two-stage pulse shaper when the connecting switch is closed. The first stage produces a square pulse for each multivibrator pulse; and the second stage, a cathode follower, has a differentiating circuit in its output that produces a sharp positive and negative pulse for each square pulse. When these sharp pulses are superimposed on the cut-off bias voltage of the type 2050 gas tube, the negative pulses have no effect, but the positive pulses fire the tube. At each firing, a 0.01-microfarad capacitor (previously charged to 300 volts) in the plate circuit of the gas tube transfers its charge to a large capacitor (either 8 or 58 microfarads) in the cathode circuit. The size of the variable resistor that discharges the large capacitor determines the voltage produced by a given pulse rate; and, therefore, this resistor is adjusted to make the instrument read 'six syllables per second' when the standard source is used. The switch in the 50-microfarad branch selects the short or long 'averaging interval.'

If a syllable count is desired, the counter can be connected while the sylrater is fed by the microphone channel.

Operation of Sylrater

In using the sylrater, the experimenter sits before the instrument panel (Figure 4), and the subject speaks, taps or otherwise participates in the test situation before the microphone. Because the sylrater measures only the sound of the movement and not the movement itself, neither direct

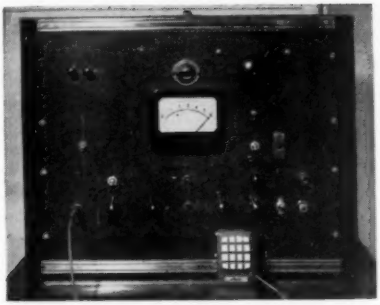

FIGURE 4. Sylrater control panel.

connection with the subject nor modification of the subject's usual mode of performance is required.

Preliminary to the actual test, a few adjustments are necessary. The panel meter is switched to measure the a-c supply voltage, which is then corrected by the turning of a control until the instrument reads full scale. Other controls are then operated to adjust a critical bias (monitored by the magic eye tube) and to set the zero on the vacuum-tube voltmeter, which incorporates the panel instrument switch in its second position. The standard six-cycle-per-second pulse source is connected to feed the sylrater, and the appropriate control is adjusted until the panel instrument reads full scale, which is calibrated 'six syllables per second.' If it is anticipated that a faster rate may occur, the instrument may be adjusted to read 'three syllables per second.' In this case all subsequent readings will have to be multiplied by two.

When the standard pulse source is disconnected and replaced by the microphone channel, the subject is asked to speak, tap, or otherwise participate. The magic eye now blinks with every syllable if the volume control is properly set. By comparing what he hears and sees, the operator can quickly make any adjustment in the volume control that is necessary. The sylrater now reads directly in sound pulses per second.

The instantaneous nature of this reading may well be questioned inasmuch as a reading in sound pulses per second suggests an averaging over some arbitrary time interval. This averaging process actually takes place in the sylrater during an interval immediately preceding the time of reading. Two averaging intervals are available to the operator. One is about two seconds long; and the other, about 15 seconds. These values are actually the RC time constants of the pulse integrator. The following examples, using the two-second time constant, may make more clear the effect of these values. If at the beginning of the two-second interval the instrument indicated *x syllables per second* and during the two-second interval the subject spoke at the rate of *y syllables per second*, the reading at the end of the two-second interval would be

$$0.632\ y + 0.368\ x.$$

Again, if at the beginning of a 4.6-second interval the instrument indicated *x syllables per second* and during the 4.6-second interval the subject spoke at the rate of *y syllables per second*, the reading at the end of the 4.6-second interval would be

$$0.9\ y + 0.1\ x.$$

Or, if the interval is increased to 9.2 seconds, the reading becomes

$$0.99\ y + 0.01\ x.$$

Both on the basis of experimental findings, and in an effort to establish the norms over a time interval similar to that used by other investigators as Fairbanks and Spriestersbach (*5*) or Blomquist (*4*), the two-second interval has been used in investigations to date. Of course, because of the nature of the electrical circuits in-

volved, there is actually no clean-cut beginning time of either of these intervals. The question is really one of how much more a recent rate should be weighted compared with an earlier rate when the averaging process is accomplished.

Procedure

Previous studies of Pettit (*9*), Schlanger (*11*), and Blomquist (*4*), have indicated that the rates of repetitive movements tend to increase with age. According to Jenkins (*6*), the upper age limit of this increase is about 18 years. Preliminary experimentation with the sylrater indicated that it would be possible to secure accurate measures with children of age 6 and above. It was decided, therefore, to test ages 6, 7, 9, 11, 13 and 15. These measures would not only provide data for a large segment of the developmental pattern, but would also approximately coincide with the age range of the public school clinic population. Age in each instance was measured at the nearest birthday.

The purpose of this investigation was to set up performance standards for subjects showing normal speech development. Therefore, no subjects were used who were regarded either by the city speech correctionist or by their classroom teacher as manifesting speech problems. Otherwise, no screening procedure was applied.

Inasmuch as the literature suggests that considerable variation may exist in the relative rates at which any one individual may produce different speech and non-speech sounds, it seemed essential to measure several representative sounds. It was decided, therefore, to study the maximum repetitive rates for the following:

1. Speech sounds:
   a. [pə]
   b. [tə]
   c. [kə]
2. Non-speech sounds:
   a. Tapping with right hand.
   b. Tapping with left hand.
   c. Tapping with both hands.

In setting up these norms, 260 subjects were tested. The distribution by age and sex was as follows: at age six, 60 subjects (30 boys and 30 girls); at each of ages seven, nine, eleven, thirteen, and fifteen, 40 subjects (20 boys and 20 girls).

Despite the fact that previous work of Ream (*10*), Blomquist (*4*), and Lundeen (*8*) has indicated that neither practice nor order of presentation has appreciable effect upon the rate obtained, each of the tests was presented consistently in the same order: that is, [pə], [tə], [kə], preferred hand, non-preferred hand, and both hands. It was thought that this use of a fixed sequence would facilitate the use of these data in the clinical situation.

The testing was done individually. Each item was demonstrated in regular sequence to each subject, who was then allowed a brief, informal practice period. Three trials of about 5 seconds each were then given for each test. The peak or maximum rate for each subject for each test item was recorded. By the use of the preset device, by means of which the operator can hold the meter at any appropriate reading, the five-second interval gave a satisfactory measure.

Results

The data were organized and given statistical treatment in an attempt to answer the following questions:

1. What are the mean rates for the

selected repetitive speech and non-speech behaviors at the ages tested?

2. What range of variation in rate may be expected in individuals showing normal speech development?

3. Do the mean rates increase with age?

4. What are the correlations (a) between the rates of different speech sounds tested; (b) between the rates of the speech sounds and the preferred hand tapping rate?

Table 1 presents the mean rates for the selected speech and non-speech sounds at each of the ages tested for both boys and girls. It will be noted that mean rate varies from 3.18 per second for [kə] for boys at age six to 5.86 per second for [pə] for boys at age 15. Insofar as the data are comparable, these means show general agreement with those found in the studies of Blomquist (*4*), and Jenkins (*6*).

An expression of the expected dispersion of rates would be of considerable clinical and research utility in the evaluation of the performance of the individual in tests of this type. Table 1 also provides the basis for such evaluation. The tolerance limits in Table 1 specify the range within which a given randomly selected case will fall with a probability of .95. Moreover, on the assumption that the remaining five per cent of the population is distributed equally beyond the upper and lower confidence limits respectively, we may predict that only 2½% of the population may be expected to fall *below* the given lower limit.

The magnitude of this range is of considerable clinical significance. Note, for example, that for 13-year-old boys, the 95% confidence limits for the tapping rate with the left hand are 2.88–6.40 taps per second. These limits imply that the maximum repetitive rate may be quite low before it indicates a possible source of speech difficulty.

The statements made in the preceding paragraph and the data presented in Table 1 assume, of course, that the forms of the frequency distributions on which the calculations have been based are sufficiently normal to justify the use of the statistical techniques employed. Yet, in the present instance, the problem of testing adequately the normalcy of distribution is complicated by the relatively small number of subjects in each age and sex group. Since inspection of the frequency distribution of each group revealed no obvious deviations, it would have been possible to have proceeded on an assumption of normal distribution. Nevertheless, it seemed desirable to attempt some verification of this assumption.

The test developed involved the comparison of the distribution of the observed and the theoretical *d*'s for [pə] for each of the 130 girl subjects. The selection of this measure was made at random. The distribution of the observed *d*'s was based on the actual difference between the obtained score for [pə] for each girl and the regression line value (Table 3) for a girl of that age for [pə]. The distribution of the theoretical *d*'s was obtained from normal distribution tables. Chi-square was used to test the goodness of fit of the observed and theoretical curves. Entering the chi-square probability tables with $n=6$ and $x^2=2.6874$, the value of p is .8. This indicates that differences as great as the present one might be expected to occur by chance 80% of the time. The hypothesis that the distribution of the scores of 130 girls for [pə] differed significantly from normal was therefore rejected. Because of the absence of obvious

TABLE 1. Means, standard deviations, and 95% tolerance limits. (Units: Mean number of sounds per second.)

			[pə]		[tə]		[kə]		*Right Hand*		*Left Hand*		*Both Hands*		*Preferred Hand*		*Non-Preferred Hand*	
Age	*N*		*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*
6	30	Mean	3.67	3.49	3.51	3.33	3.28	3.18	3.70	3.53	3.40	3.34	3.41	3.31	3.70	3.56	3.40	3.30
		S.D.	.4187	.3827	.4299	.3650	.3916	.3188	.3718	.4356	.4612	.3718	.3872	.3581	.3837	.3801	.4514	.4098
		Limits	2.60-4.74	2.51-4.47	2.41-4.61	2.40-4.26	2.28-4.28	2.37-3.99	2.75-4.65	2.42-4.64	2.22-4.58	2.39-4.29	2.42-4.40	2.40-4.22	2.72-4.68	2.59-4.53	2.25-4.55	2.26-4.34
7	20	Mean	4.38	4.34	4.33	4.14	3.88	4.02	4.04	3.84	3.58	3.38	3.53	3.40	4.06	3.84	3.56	3.38
		S.D.	.5014	.5887	.5182	.4224	.4077	.4025	.3662	.3721	.4841	.3473	.5253	.3539	.3531	.3721	.4782	.3473
		Limits	3.00-5.76	2.72-5.92	2.90-5.76	2.98-5.30	2.76-5.00	2.91-5.13	3.03-5.05	2.82-4.86	2.25-4.91	2.42-4.34	2.08-4.98	2.43-4.37	3.09-5.03	2.82-4.86	2.24-4.88	2.42-4.34
9	20	Mean	4.40	4.56	4.32	4.49	3.94	4.19	4.22	4.70	3.54	4.08	3.54	4.03	4.26	4.70	3.52	4.08
		S.D.	.4989	.4070	.5035	.4844	.4499	.5190	.6648	.4136	.5365	.4384	.5869	.5069	.6533	.4136	.5081	.4384
		Limits	3.03-5.77	3.44-5.68	2.93-5.71	3.16-5.82	2.70-5.18	2.76-5.62	2.39-6.05	3.56-5.84	2.06-5.02	2.87-5.29	1.92-5.16	2.64-5.42	2.46-6.06	3.56-5.84	2.12-4.92	2.87-5.29
11	20	Mean	4.88	4.80	4.84	4.75	4.46	4.52	4.81	4.88	4.38	4.36	4.42	4.26	4.81	4.88	4.38	4.36
		S.D.	.2390	.4763	.4903	.5375	.4464	.5779	.4855	.3522	.5081	.3410	.5743	.4109	.4855	.3522	.5081	.3410
		Limits	4.22-5.54	3.49-6.11	3.49-6.19	3.27-6.23	3.23-5.69	2.93-6.11	3.47-6.15	3.91-5.85	2.98-5.78	3.42-5.30	2.84-6.00	3.13-5.39	3.47-6.15	3.91-5.85	2.98-5.78	3.42-5.30
13	20	Mean	5.44	5.17	5.22	5.09	4.76	4.84	5.34	5.38	4.86	4.64	4.92	4.60	5.37	5.42	4.84	4.62
		S.D.	.4174	.6433	.5815	.6601	.4979	.6386	.4717	.5174	.6572	.6411	.6075	.6415	.4835	.4987	.6235	.6175
		Limits	4.29-6.59	3.40-6.94	3.62-6.82	3.27-6.91	3.39-6.13	3.08-6.60	4.04-6.64	3.96-6.80	3.05-6.67	2.88-6.40	3.25-6.59	2.83-6.37	4.04-6.70	4.05-6.79	3.12-6.56	2.92-6.32
15	20	Mean	5.44	5.86	5.38	5.77	5.00	5.27	5.18	5.52	4.84	5.30	4.94	5.28	5.20	5.64	4.83	5.18
		S.D.	.4774	.6108	.5406	.6036	.5170	.7335	.4749	.5842	.6732	.7193	.5978	.5552	.4735	.4936	.6658	.7225
		Limits	4.13-6.75	4.18-7.54	3.89-6.87	4.11-7.43	3.58-6.42	3.25-7.29	3.87-6.49	3.91-7.13	2.99-6.69	3.32-7.28	3.29-6.59	3.75-6.81	3.90-6.50	4.28-7.00	3.00-6.66	3.19-7.17

TABLE 2. Significance of age differences. (Units: sounds per second.)

		[pə]						[tə]						[kə]						*Right Hand*					
		Girls			*Boys*			*Girls*			*Boys*			*Girls*			*Boys*			*Girls*			*Boys*		
Age	*N*	*Mean*	*Diff.*	*Sig.*	*Mean*	*Diff.*	*Sig.*	*Mean*	*Diff.*	*Sig.*	*Mean*	*Diff.*	*Sig.*	*Mean*	*Diff.*	*Sig.*	*Mean*	*Diff.*	*Sig.*	*Mean*	*Diff.*	*Sig.*	*Mean*	*Diff.*	*Sig.*
6	30	3.67	.71	**	3.49	.85	**	3.51	.82	**	3.33	.81	**	3.28	.60	**	3.18	.84	**	3.70	.34	**	3.53	.31	*
7	20	4.38			4.34			4.33			4.14			3.88			4.02			4.04			3.84		
7	20	4.38	.02		4.34	.22		4.33	−.01		4.14	.35	*	3.88	.06		4.02	.17		4.04	.18		3.84	.86	**
9	20	4.40			4.56			4.32			4.49			3.94			4.19			4.22			4.70		
9	20	4.40	.48	**	4.56	.24		4.32	.52	**	4.49	.26		3.94	.52	**	4.19	.33		4.22	.59	**	4.70	.18	
11	20	4.88			4.80			4.84			4.75			4.46			4.52			4.81			4.88		
11	20	4.88	.56	**	4.80	.37	*	4.84	.38	*	4.75	.34		4.46	.30		4.52	.32		4.81	.53	**	4.88	.50	**
13	20	5.44			5.17			5.22			5.09			4.76			4.84			5.34			5.38		
13	20	5.44	.00		5.17	.69	**	5.22	.16		5.09	.68	**	4.76	.24		4.84	.43		5.34	−.16		5.38	.14	
15	20	5.44			5.86			5.38			5.77			5.00			5.27			5.18			5.52		
		Left Hand						*Both Hands*						*Preferred Hand*						*Non-Preferred Hand*					
6	30	3.40	.18		3.34	.04		3.41	.12		3.31	.09		3.70	.36	**	3.56	.28	*	3.40	.16		3.30	.08	
7	20	3.58			3.38			3.53			3.40			4.06			3.84			3.56			3.38		
7	20	3.58	−.04		3.38	.70	**	3.53	.01		3.40	.63	**	4.06	.20		3.84	.86	**	3.56	−.04		3.38	.70	**
9	20	3.54			4.08			3.54			4.03			4.26			4.70			3.52			4.08		
9	20	3.54	.84	**	4.08	.28	*	3.54	.88	**	4.03	.23		4.26	.55	**	4.70	.18		3.52	.86	**	4.08	.28	*
11	20	4.38			4.36			4.42			4.26			4.81			4.88			4.38			4.36		
11	20	4.38	.48	*	4.36	.28		4.42	.50	*	4.26	.34		4.81	.56	**	4.88	.54	**	4.38	.46	*	4.36	.26	
13	20	4.86			4.64			4.92			4.60			5.37			5.42			4.84			4.62		
13	20	4.86	−.02		4.64	.66	**	4.92	.02		4.60	.68	**	5.37	−.17		5.42	.22		4.84	−.01		4.62	.56	*
15	20	4.84			5.30			4.94			5.28			5.20			5.64			4.83			5.18		

**Significant at the 1% level of significance.
*Significant at the 5% level of significance.

deviations, because of the correlations between the various measures, and because of the great consistency of the regression lines, application of this test was not made to the other items.

Table 2 is concerned with the size and statistical significance of age differences in mean rates. The *t*-test of the significance of the difference in means was applied at each successive age level for boys and girls respectively. As shown in Table 2, the results of the tests were not uniform. Of the 80 tests performed, 30 were significant at the 1% level, 11 were significant at the 5% level, and 39 failed to reach significance at the 5% level. These data, although suggesting that the rate of change is small in comparison with variability of change, do not necessarily contradict the concept of a somewhat uniform rate of increase with age.

In an attempt to demonstrate any tendency for the mean rates to increase with age, regression lines for each of the eight measures were computed for the 130 boys and the 130 girls respectively. To determine whether or not the slope of each line differed significantly from zero (that is, no change with age), the *t*-test was applied. Each of the 16 tests made was significant at the 1% level of confidence. The hypothesis that mean rates do not increase with age during the age period studied was therefore rejected. These data are presented in Table 3.

It will be noted that the data in Tables 2 and 3 have been organized primarily in terms of age rather than sex differences in the mean rates. Nevertheless, as data on the boys and the girls have been kept separate in each table, it is possible to make certain statements concerning sex relationship from these measurements. Thus, although Table 2 fails to demonstrate systematic sex differences in

TABLE 3. Regression lines and *t*-values obtained for testing the slope of the line. In columns 2 and 4, x is the age of the subject.

Item	*Girls* *Regression Line*	*t*†	*Boys* *Regression Line*	*t*†
[pə]	2.7834 + .1887x	6.325**	2.4695 + .2197x	6.816**
[tə]	2.6864 + .1882x	5.993**	2.2478 + .2309x	7.597**
[kə]	2.4117 + .1779x	8.390**	2.3173 + .1986x	6.635**
Right Hand	2.7030 + .1815x	6.666**	2.3624 + .2242x	7.830**
Left Hand	2.2316 + .1838x	6.005**	2.0079 + .2140x	12.545**
Both Hands	2.1240 + .1970x	6.345**	2.0020 + .2111x	13.421**
Pfd. Hand	2.7094 + .1827x	6.721**	2.2991 + .2335x	9.411**
Non-Pfd. Hand	2.2230 + .1835x	6.016**	2.0565 + .2062x	13.176**

**Statistically significant at the 1 per cent level of confidence.
† *t* at 1 per cent level for 4 *df* = 4.604.

TABLE 4. Pearson (r) correlations (a) between the rates of different oral sounds and (b) between the rates of different oral sounds and the tapping rates for the preferred hand. (Units: sounds per second.)

Correlation (r) between:	*Seven Year*				*Nine Year*			
	Girls		*Boys*		*Girls*		*Boys*	
	r	*Sig.*	*r*	*Sig.*	*r*	*Sig.*	*r*	*Sig.*
[pə] and pfd. hand	.463	*	.365		−.025		.739	**
[tə] and pfd. hand	.511	*	.382		−.096		.471	*
[kə] and pfd. hand	.321		.498	*	.099		.434	*
[pə] and [tə]	.807	**	.620	**	.746	**	.748	**
[pə] and [kə]	.545	**	.631	**	.615	**	.808	**
[tə] and [kə]	.637	**	.665	**	.477	*	.885	**

Correlation (r) between:	*Eleven Year*				*Thirteen Year*			
	Girls		*Boys*		*Girls*		*Boys*	
	r	*Sig.*	*r*	*Sig.*	*r*	*Sig.*	*r*	*Sig.*
[pə] and pfd. hand	.269		.358		.255		.349	
[tə] and pfd. hand	.564	**	.382		.569	**	.315	
[kə] and pfd. hand	.706	**	.175		.232		.315	
]pə] and [tə]	.508	*	.731	**	.572	**	.815	**
[pə] and [kə]	.533	*	.791	**	.552	**	.680	**
[tə] and [kə]	.822	**	.831	**	.690	**	.801	**

**Significant at the 1% level of significance.
*Significant at the 5% level of significance.

mean rates for the same age groups, a possible tendency may be noted for the younger boys to be slower than the younger girls and for the older boys to be faster than the older girls. But because both inspection and graphing of the data in Table 1 failed to reveal consistent patterns of differences, no t-tests were applied. Yet, in Table 3, it is interesting to note that for each of the 16 regression lines computed, the factor by which age is multiplied is invariably slightly larger for the boys than for the girls.

These findings are not inconsistent with the results of previous investigations. Thus Blomquist (*4*) and Fairbanks and Spriestersbach (*5*) report no statistically significant differences; Jenkins (*6*) reports females to be slightly superior; and Ream (*10*), West (*15*), and Lundeen (*8*) have reported a slight difference in favor of the male.

Table 4 presents the correlations between the various speech and tapping rates. These coefficients range from -.096 between [tə] and the preferred hand for nine-year-old girls to +.885 between [tə] and [kə] for nine-year-

old boys. In 24 of 48 comparisons, the correlations were significant at the 1% level; in 9, at the 5% level; and in 15, not significant at the 5% level.

It is difficult to draw general conclusions from these data. Nevertheless, Table 4 does suggest that the correlation between the oral sound rates is consistently greater than the correlation between any one oral sound rate and the tapping rate with the preferred hand. This difference indicates that variation in the maximum repetitive rate is, at least in part, a function of the specific kinds of movements involved. This finding and the general level of the correlations fail to indicate that any single measure, as [pə], may safely be taken as an accurate index of the ability to execute rapid repetitive movements. Nevertheless, the fact that all statistically significant correlations are positive does suggest the existence of some generalized ability to execute rapid repetitive movements.

Summary

A new instrument, the sylrater, for obtaining maximum repetitive rates has been described. Tentative norms for representative speech and nonspeech sounds have been established for ages six, seven, nine, eleven, thirteen, and fifteen years both for boys and girls. At a later date, it is planned (a) to establish norms for a wider age range, (b) to study the rates for certain handicapped groups, (c) to study the additional correlations implicit in Table 4.

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An Investigation Of The Definition And Use Of The Diagnosis, 'Primary Stuttering'

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THE PURPOSE of this article is to report and discuss the results of a questionnaire investigation of what the term 'primary stuttering' means to workers in the field of speech therapy, how it is used in diagnosis, and what therapy consists of when such a diagnosis is used.

Initially, the authors became concerned with the use of the term when confronted over a period of years with children manifesting severe stuttering symptoms who had previously been diagnosed as 'primary stutterers.' In each case, according to parental reports, treatment consisted of such advice as to 'ignore,' and 'show no concern and make no comment' about whatever it was in the child's speech that alarmed them. The parents claimed to have accepted and followed the specialist's advice, but the stuttering, rather than disappearing, had become more intensified.

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Further impetus was given to mounting curiosity regarding this term through consultation with other members of the profession who verbally expressed concern over the use of the term, and pointed out great difficulty in recalling a single case who met the requirements of the 'accepted' definitions of 'primary stuttering.'

The natural result of these observations gave rise to the question, 'What is primary stuttering?' An investigation of the literature revealed an increasing use of the term without clarification of the nature of the condition. It was difficult to determine from the published literature whether primary stuttering was to be regarded as a normal or an abnormal speech condition; whether it was malignant or benign.

When it was decided to ask for the opinion of a sampling of workers in the field regarding the definition and use of the term 'primary stuttering,' our hypothesis, which had grown out of personal observations, was: There is confusion and disagreement as to the definition and use of the term 'primary stuttering.' We were further interested in learning how the condition of 'primary stuttering' was being handled after such a diagnosis, and to what extent the diagnosis was actually being employed.

TABLE 1. Job classifications of 425 persons to whom questionnaire was sent.

Job Classification	*Percentage**
Director of College Clinic	16
Prof. or Asst. Prof.	18
Pub. School Sp. Correctionist	25
Private Practice	3
Affiliated with Health Dept.	1
Affiliated with Special School	8
Medical Affiliation	5
College Affiliation (non-teaching)	7
Unknown (not listed in ASHA Directory)	16

* Percentages total 99 due to rounding.

To obtain the information, the following questions were constructed:

1. How do you define 'primary stuttering?'

2. Do you use the diagnosis of 'primary stuttering?'

3. How is the case handled after such a diagnosis is made?

This questionnaire was sent to 425 members of the American Speech and Hearing Association. The number of questionnaires per geographical location was limited and, in large metropolitan areas, selection was made on the basis of the various types of agencies with which the speech therapists were affiliated. The types of positions held by the members fell into nine major job classifications. Although the numbers in some of the groups were too small to warrant close analysis in comparing replies, the distribution seemed to cover the field satisfactorily (see Table 1).

One hundred seventy-one, or 40 per cent of the members replied to the questionnaire. In spite of the limited response, the unusual variability of the replies seemed to warrant analysis. The distribution of replies according to job classification was very similar to the total group sent out (see Table 2).

Question 1

Perhaps the most significant outcome of this investigation lies in the heterogeneity of the replies to Question 1: How do you define 'primary stuttering'? Categories were set up to group these replies to provide a tool with which to show gross similarities, but within each category there was a wide range of differences. Therefore, in constructing each category, we chose the major similarity and then attempted to indicate the variability within the category by ways in which the statements were qualified. The result gave eight major classes and 30 qualifications:

1. Nineteen per cent of the total replies described primary stuttering in terms of repetitions, hesitations, and prolongations. All replies in this category had the above in common, but differed among themselves in the following ways:

a. Without awareness or secondary characteristics.

b. Rapid, easy repetitions or short effortless prolongations, without awareness.

TABLE 2. Job classifications of 171 persons replying to questionnaire.

Job Classification	*Percentage Replying*
Director of College Clinic	53
Prof. or Asst. Prof.	40
Pub. School Sp. Correctionist	39
Private Practice	28
Affiliated with Special School	0
Affiliated with Health Dept.	47
Medical Affiliation	49
College Affiliation (non-teaching)	50
Unknown (not listed in ASHA Directory)	25

c. Hesitant or repetitious speech without awareness.

d. Easy, effortless repetitions, prolongations or hesitations without awareness.

e. Interruptions found in a person's speech; without awareness.

f. Fairly slight hesitations or blocks without facial grimaces or stamping of feet, etc.

g. Sound repetition without blocks.

h. Breaks in fluency, or repetitions with inappropriate pauses and hesitations.

i. Hesitations, prolongations and repetitions without anxiety reactions.

It can be easily noted that, as a group, these replies were restricted to a description of the non-fluency emitted by the subject in question. The greatest similarity within the group was in the use of a few technical terms. The greatest variability was in the use of descriptive words such as 'fairly slight,' 'easy,' 'inappropriate,' etc. The group that favored this definition most was the non-teaching college people, and the smallest group favoring it was the group of directors of college clinics.

2. Twenty per cent of the persons replying indicated that they did not make a distinction between primary and secondary stuttering. They further indicated that they preferred to speak in terms of stuttering and degree of stuttering behavior in the following ways:

a. Stuttering without secondary characteristics.

b. Describe speech in terms of severity of stuttering behavior.

c. Describe symptoms of stuttering without awareness.

d. Simple inhibition without awareness.

The deciding factor in setting up this category was that none of these replies disputed the presence or absence of 'stuttering,' but were concerned merely with the degree of stuttering and awareness.

3. Eleven per cent of the total replies defined 'primary stuttering' as a 'stage of stuttering,' and qualified their statements in the following ways:

a. With awareness.

b. Without awareness or secondary characteristics.

c. Hardly aware.

Although all replies in this category defined 'primary stuttering' in terms of 'stage of stuttering,' there was much disagreement as to whether or not the stutterer was aware of his problem. Most replies seemed to imply that stuttering is a progressive disorder, and that 'primary stuttering' was the initial stage of the disorder. Considering all the replies, this was not as frequently used as the first two definitions. However, 16 per cent of the directors of clinics preferred it. None of the respondents in private practice or who were medically affiliated considered 'primary stuttering' as a stage of stuttering.

4. Included in this category are those replies that define 'primary stuttering' as a developmental stage in speech learning. Five per cent of the total replies used this definition.

Those who gave this definition indicated that this period occurs between the ages of two and five. It is that period of 'normal speech development' that they call 'primary stuttering.' This definition was preferred by a relatively small percentage.

5. Twelve per cent referred to textbook examples of definition. These sources were:

a. Bluemel (*1*)

b. Van Riper (*2*)

All of the replies in this group either quoted directly the definitions given

by the above authors in their texts, or gave the page number on which the definitions could be found.

6. Seventeen per cent of the total replies defined 'primary stuttering' as speech that differs significantly from normal in the following ways:

a. Frequent, excessive repetition without awareness.

b. Repetitions, hesitations, prolongations or blocks, more frequent than the norm for that age.

c. Frequent, effortless repetitions, prolongations or hesitations, with awareness, but without secondary characteristics.

d. Disturbance in the rhythm of speech other than normal.

e. Noticeable or previous blocks or hesitancy.

At first glance, this group appears to be similar to group 1 in the use of 'repetition,' 'hesitation,' and 'prolongation.' The distinguishing characteristic, however, was that in all cases the definitions stated that the non-fluency was significantly greater than what is to be expected in 'normal speech.'

7. Two per cent of the total replies defined 'primary stuttering' as excessive non-fluency reflecting emotional disturbance. While many replies, in discussing therapy for the primary stutterer, went into detail about emotional problems, only two per cent of the entire group mentioned emotional causation in their definition.

No one in the groups of Public School Speech Correction, Private Practice, Special Schools, College Affiliation (non-teaching) or Unknown gave a definition that could be included in this category.

8. Six per cent of the entire group defined 'primary stuttering' as 'normal non-fluency.' There were only four groups who gave 'normal non-fluency' as a definition.

9. Seven per cent of the total replies received did not define 'primary stuttering.' Reasons for not defining were as follows:

a. The term 'primary stuttering' implies a dichotomy.

b. The term 'primary stuttering' is meaningless and worthless.

c. The term is not used in order to avoid labeling.

d. The term is not used.

e. The term is used only to refer students to textbooks that use the term.

f. Did not define because of lack of experience with stutterers.

Discussion. Evaluation of the 171 replies to Question 1 revealed a lack of agreement among qualified workers as to what is meant by 'primary stuttering.' In terms of speech, this survey indicates that 'primary stuttering' could be anything from normal speech to obvious stuttering with awareness. Among those who mentioned behavior there was a wide range from 'normal' to an 'emotionally disturbed child.' While most confined the age of 'primary stuttering' to a preschool age group, several mentioned that the condition is known to persist into adulthood.

It is evident that for a large group the criterion for the distinction between 'primary' and 'secondary' stuttering was the awareness or lack of awareness of the problem on the part of the individual. We assume awareness to include anxiousness. Not one of the replies, however, indicated techniques or criteria to determine awareness or lack of awareness. It was also pointed out by several that it is extremely difficult to prove that a child is *not* anxious or aware of stuttering even as early as 2½ years of age. Therefore, it would seem that, before 'awareness' can be accepted as

the criterion for differential diagnosis, it is necessary to perfect a way of measuring 'awareness.'

Through evaluation of these replies, the lack of scientific study given to the definition of 'primary stuttering' was apparent. The advisability of the use of such a diagnosis is questionable (see Question 2), but, if it is to be employed, then this investigation clearly points to the need of establishing basic criteria—be they fluency norms, behavior and adjustment, or more intensive study of speech development.

Question 2

Evidence of disagreement as to the use of the diagnosis of 'primary stuttering' was given in the replies to Question 2: 'Do you use the diagnosis?' In order to show the variability of the reasons why the definitions were or were not used, the replies were divided into seven groups. Groups one and seven were regarded as positive replies and contained 61 per cent of the total replies. Groups two-six were regarded as negative replies and contained 39 per cent of the total replies. The category divisions for the replies to Question 2 are as follows:

1. Yes, the diagnosis is used.
2. No, the diagnosis is not used.
3. No, 'primary stuttering' is not used in preference to speaking of the child as 'non-fluent.'
4. No, the diagnosis is not used in order to avoid labeling.
5. No, the diagnosis is not used because of lack of experience with stutterers.
6. No, another term is used.
7. Yes, used on records, but never to parents or case.

Approximately the same ratio of use and non-use of the diagnosis of 'primary stuttering' was found upon examination of the per cent of each job classification and their response to Question 2.

Discussion. After examining the replies to Question 2, it was evident that no particular group showed an unusual preference for the use of the diagnosis of 'primary stuttering.'

There was an obvious split as to the acceptance of the diagnosis. Although 93 per cent of the total group gave some sort of definition of primary stuttering, only 61 per cent of the total group indicated that they used the diagnosis. Many of those who do use the diagnosis indicated that it could be applied in very few cases due to the difficulty in establishing evidence that the 'child is unaware of his speech difficulty.'

In our opinion, the importance of the replies to Question 2 rests on the lack of agreement as to the acceptance of the diagnosis.

Question 3

The replies to Question 3, 'How is the case handled after such a diagnosis is made,' were as varied as the definitions of 'primary stuttering.' The differences in the therapeutic approach were more obvious, however, and grouped distinctly into the following categories:

1. Fourteen per cent of the total group indicated that they attempted to determine and eliminate underlying emotional causes. They were specific in stating that there would be no direct contact with the child. (To be included in this group, a reply had to indicate that some form of psychotherapy took place with the parents other than the initial interview.) This approach in therapy was second in popularity, and was preferred by a

relatively high percentage of each job classification.

It is interesting to note that although only 2 per cent of the entire group mentioned emotional disturbance when defining 'primary stuttering,' 14 per cent of them devote all of the time in therapy to locating and eliminating underlying emotional causes.

2. Thirty-four per cent of the total group indicated that therapy would consist of parent-teacher education and that there would be *no direct* contact with the child.

This was the most popular approach in treating the 'primary stuttering.' All responses in this group indicated that 'conferences' were held, but were limited to giving advice on 'not labelling'; lectures on normal speech development; handling the child; providing favorable speaking situation; do's and don'ts for stutterers and in giving out pamphlets on stuttering.

Most replies gave only one or possibly two suggestions. The typical reply was 'a parent-teacher conference is held in which the danger of labeling the child as a stutterer is explained, and a copy of do's and don'ts for stutterers is giving to each parent.'

3. Seven per cent of the total group indicated that the only therapy they would use would be to 'inform the parent that the child was normal in every respect.'

4. Eight per cent of the entire group indicated that they would administer individual speech therapy. The type of therapy was so diversified that it will serve the purpose merely to list a few ways which were suggested to help the 'primary stutterer': 'Songs'; 'poetry'; 'rhythm games'; 'Gestalt technique'; 'treatment aimed at specific manifestation of stuttering'; 'whispered speech'; 'posture exercises'; 'controlled breathing'; 'dictation'; 'playing games until the child realizes he has a speech problem.'

Some replies indicated that they would supplement this 'individual speech therapy' with parent-teacher conferences.

5. Sixteen per cent of the total group indicated that they used group therapy in the treatment of the 'primary stutterer.' All replies in this group indicated a type of 'speech therapy,' but qualified the therapy as to 'direct' and 'indirect' approach. Some of the replies also stated that they supplemented the therapy by 'parent counseling.' There was no indication that this counseling was of a psychotherapeutic nature.

6. Eight per cent of the entire group of replies indicated that psychotherapy for *parent* and *child* would be used in the treatment of the 'primary stutterer.' All replies discussed the environmental causation and the importance of treating the parents as well as the child.

7. Five per cent of the entire group indicated that their approach in therapy would follow directly the approach as outlined by Bluemel or Van Riper in their textbooks.

8. Five per cent of the entire group indicated that treatment would be based on the needs of the individual case after investigating possible causative factors. This group indicated a psychotherapeutic approach, but said that, because the dynamics of each case are so varied, it would be impossible to outline step by step procedure.

9. Five per cent of the entire group did not describe therapy because they do not use the diagnosis of 'primary stuttering.'

An interesting comparison with the replies in this category is that, although 39 per cent of the total group

do not use a diagnosis of 'primary stuttering,' only 13 per cent of the total group hesitate to describe therapy. Of the Public School Speech Correctionists who replied, 34 per cent do not use the diagnosis of 'primary stuttering,' but all of them described some type of therapy.

10. Eight per cent of the entire group's replies were not usable for evaluation because they were either too vague to evaluate or that they said they did no work with stutterers.

Discussion. The range in approach to therapy is easily observed to be as great as the range of definition of 'primary stuttering.' The therapy suggested ranged from accepting the speech of the child as normal to administering treatment aimed at the specific manifestation of stuttering. The behavior of the 'primary stutterer' was described in many ways, with a range from 'normal in all respects' to behavior which indicated a need for intensive psychotherapy. The role of the speech therapist in treating the 'primary stutterer' ranged from a dispenser of pamphlets and information on 'normalcy' to a speech pathologist and psychotherapist.

It became obvious during the evaluation of the replies to Question 3 that the variability in therapy was directly related to whether or not 'primary stuttering' was regarded as normal or abnormal speech behavior.

Conclusion

As a result of this study, the authors have made certain observations which may be helpful in attacking the problem. The results of this investigation are presented in evidence and support of the hypothesis of the lack of agreement among people engaged in speech therapy regarding 'primary stuttering.' Many of the people replying voiced concern and dissatisfaction over the existing dilemma and expressed alarm of minimizing the speech problem of even a 2½-year-old child by such words as 'primary,' for 'their speech and emotional problems warrant as careful and scientific approach as those of the adult.'

It was obvious that no one who replied could give satisfactory techniques for making a careful differentiation between so-called 'primary' and 'secondary' stuttering. Unless we can develop techniques to do so, it would seem, on the basis of the information gathered, that we as a group will have done a great injustice to the young children and their parents who seek our help.

Although a small percentage of the total group regard 'primary stuttering' as normal speech and 39 per cent do not use the diagnosis, 87 per cent of the total group recommend some form of therapy. This, of course, indicates that a substantial per cent of the workers who replied feel that there is definitely something in the speech of some young children that compels both parents *and* therapists to do *something* about it.

It is our purpose in reporting this initial study to give evidence for the need to consider this area seriously for more intensive investigation.

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Some Indians Who Stutter

Edwin M. Lemert

This is a report and tentative interpretation of research on stuttering among a number of Indian groups on the Northwest Pacific Coast. The data were obtained by field contacts, interviews and observation covering eight reserves of Salish Indians, two Kwakiutl and one Nootka, all located on the coastal mainland of British Columbia and Vancouver Island. The research in the culture area proper was supplemented with interviews from two Haida informants, one Tsimshian and one Nootka who were not living in their respective areas. In addition to this body of interview data, we secured information from school officials and also some written materials from Indian children at the Port Alberni and Alert Bay residential schools.

In general our findings conflict with reports by Johnson (*2, 3*), Snidecor (*6*) and Bullen (*1*) of an absence of stuttering among American Indians. Thus we encountered (1) both stuttering speech and persons regarded as stutterers among the contemporary coastal Indians, (2) evidence of preacculturational existence of this type of speech disorder, and (3) well-defined concepts of stuttering and stutterers in the language and cultures of all of the bands we came to know.

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Without trying to establish a rate of stuttering for the Indian population of the whole area we may record the following facts: Two stutterers were identified for us at the Alert Bay school where the enrollment is 220; at the Port Alberni school there were two stutterers for a pupil population of 240; at the Cowichan day school out of a population of 110 'quite a few' students were stated to have trouble with 'g' sounds associated with self-consciousness and embarrassment. All of our 13 native informants were acquainted with at least one or two cases of stuttering and several stated that the disorder was commonplace among their people. The two Nootka informants were especially clear on this point. In three Salish bands with a population of nearly 370, we came to know intimately seven adults, six men and one woman, who currently were stutterers. This percentage of about 1.9 approximates the estimated incidence of stutterers for our own population (7).

We were able to interview directly and observe the speech of two stutterers, one a Salish boy of 14 years of age and the other a Tsimshian youth of 20 years. Their case histories follow:

Case 1: Stanley Joseph is an illegitimate son of Emily and has two brothers and one sister, the latter also being illegitimate. His mother in her earlier life drank heavily and was sexually promiscuous. She continues

to make and drink home brew and is drunk and abusive much of the time. Her husband is a logger who drinks moderately. Early in Stanley's life the mother habitually accompanied her husband to live in logging camps, at which times she left Stanley in charge of his older sister, Mary Jane, who is also drunken and sexually promiscuous, and given to occasional prostitution. Mary Jane obviously regards her younger brother as a burden and incorrigible; she repeatedly tells others, 'Can't do a thing with him.' Stanley has badly broken speech, the most obvious symptom of which is disrupted breathing in the form of gasps before words, which he is able to say only after long pauses. When he tries to speak he strains, blinks his eyes and draws his head down on his chest. Characteristically, he has trouble with his speech in both Salish and English. His difficulties are greater in school than at home, where the pressure to speak in a formal way is much greater. He says that the other children laugh at him when he stutters and that this 'makes him feel bad.'

Case 2: Alfred McGill comes from Greenville, a town founded by early Methodist missionaries on the Nass River. Both his maternal and paternal grandfathers were chiefs in the Tsimshian tribe. His father has the equivalent of one year of college education and was the first lay reader of the local Anglican church. He is an ordained minister, but was always reluctant to assume responsibility for a church of his own. His occupation is that of carpenter and fisherman and he has been very prosperous even by White standards. Alfred has been brought up as a strict Methodist, with constant insistence by the father that he avoid all smoking and drinking. The father further stressed the importance of being a gentleman at all times and when Alfred went away to high school his father told him to think of himself as an ambassador of the Tsimshians.

Alfred is physically small, the shortest male in his family. His next oldest brother excelled him in athletics which he felt very keenly because of the importance attached to athletic prowess by the Tsimshians. He began to work on his father's boats when he was eight years old. When he reached nine years he went away to a residential school for Indian children, but continued to work with his father during the summers. When he was 15, Alfred went to Vancouver where he entered high school. This was a White high school, Alfred and his cousin being the first Indians to enter it. At first he felt very conspicuous and he was unused to the great freedom which he was given in contrast to the residential school. Ultimately he caught up in his studies and came to distinguish himself in athletics, especially boxing. Following high school he spent one year in a university at Vancouver, after which he received a year's training in the Normal school at Victoria. This was sufficient to qualify him for his present job of teaching.

Alfred has stuttered as far back as he can remember, although his disorder grew more pronounced while he was in high school. As a small child he was very shy, so much so that he always lagged behind his parents when they walked into town. His mother attributed his trouble to nervousness and pronounced words for him. His father took a critical attitude, using the native term for 'acting crazy' when he reprimanded him for his stuttering. His main difficulties came

on 'sh' and 'ed'[1] sounds. At an early age he avoided speech situations when he could and at the residential school he tried to keep from reciting in class. In high school he grew exceedingly self-conscious about his speech; here he began to substitute synonyms for words on which he blocked and also began to lower his head, cover his mouth with his hand, and fiddle with his necktie in order to conceal his inability to speak. While at Normal school he came under the guidance of a speech instructor who sought to break his habit of word substitution. At the present time he still lowers his head and covers his mouth with his hand as he approaches a feared word. He has trouble with the same 'sh' and 'ed' sounds.

These cases, in our estimate, exemplify in several important particulars stuttering as it appears in White persons in our own society, namely, in the presence of word blocks, anxiety, and awareness of social disapproval. We noted especially the so-called 'secondary' manifestations of stuttering in the form of blinking the eyes, drawing the head down, and in disturbed breathing. These symptoms which are commonly interpreted as a function of the person's anxiety or anticipation of probable social penalties of his speech failure also came out in other reported cases. In one such case the man 'danced up and down to get the words out' and in another the man 'squeezed his eyes shut,' usually giving up after a struggle to speak and announcing that he couldn't say the word.

It may strike the critical reader that despite the obvious influence of aboriginal culture patterns (especially in Case 2) behind the stuttering in these cases their more significant etiology may lie in personal disorganization and psychic conflict resulting from acculturation. Consequently other kinds of data are necessary to demonstrate the probability of its occurrence under aboriginal conditions.

Evidence that stuttering occurred aboriginally before any significant contacts and interaction with White culture in the area was of three sorts: (1) The dates of the birth and childhood development of known cases of stutterers, (2) the knowledge of aboriginal methods of treating and 'curing' stuttering, and (3) the linguistic recognition of the defect. A number of cases were known in which the stutterers had been children between 1865 and 1880, dates which precede or barely coincide with establishment of the first religious missions in the area. One informant now 55 years of age gave the case history of his grandfather who was a stutterer. The grandparent's childhood dated back at least to 1855 and possibly to 1840, at a time when the degree of contact and interaction with White population by the Indians of his band was limited to fur trade.

A somewhat different type of data pointing to the early pre-White contact occurrence of stuttering among the coastal Indians came from descriptions given us of native methods of 'curing' stuttering. These included such things as hitting the stutterer's arm, striking a block of wood placed at the back of his head, mingling his saliva was the rain dripping off the roof shakes, ritual eating, gargling with noxious concoctions of herbs and crushed nettles, and treatment by a shamman who employed a variety of medicines, rituals and songs. The Tlahoose and Homalthko may lay claim to the most unique and dramatic of the cures described for us;

[1] Approximated.

in these bands the stutterer was instructed to find a board with a knothole in it and every morning on arising to recite to it *ha'ak'ok chen* (I give my stuttering to you) and then spit or blow through the hole in order to get the stuttering out of his throat.

It is most improbable that such well-defined methods of treating stuttering arose after culture contact. These patently are primitive or folk techniques and bear no sign of White influence or borrowing.

Perhaps even more telling proof of the very early, preacculturative presence of stuttering in the Northwest Pacific Coast lies in the widespread linguistic recognition of the disorder. Every tribal language of which we inquired contained words for stuttering as well as for certain other speech disorders. As far as we could tell there were no borrowed English words or intertribal borrowings to designate stuttering. A partial indication of the number and variety of speech disorders recognized and named in the coastal tribes of the area is given in the following list:

Homalthco, Tlahoose, Sliammon
stuttering *ha'ak'ok*[2]

Comox
stuttering *hahk'ok*

Cowichan, Seschelt, Squamish
stuttering *o'tsa'tsa*

Nanaimo
stuttering *skeykulskwels*
lisping *'ustcowits*
a mute *'ustcimaltlas* (one with his tongue between his teeth)

Haida (Skidegate)
stuttering *kilekwigu'ung* (broken voice)
lisping *stul'da'ga* (pointing with your finger)

Tsimshian (Nass River)
stuttering *ach'al*
lisping *stats'a'dilk* (biting your tongue)

Kwakiutl
stuttering *kaketsakwa*
mutism *bin'tsa'tso'la*
cleft palate *am'ho*

The Nootka of the west coast of Vancouver Island merit special comment chiefly because of Edward Sapir's (*5*) early research on this tribal area and also because of the way in which the Nootka language is modified and adapted to reckon culturally with a wide variety of speech defects. Sapir described, in all, five speech abnormalities in Nootka, although two of them probably can be reduced to variants of lisping. The other three are stuttering, cleft palate speech and involuntary nasalization. Our two Nootka informants described, respectively, three and four different speech defects; the older of the two, from Nootka Sound, spoke of the following: *habuchin*–stuttering; *tlatlachkin* –blocking or 'pinching off' words; *ninichin*–straining to get words out. The other man, from the Uchucklesit band at Port Alberni, gave a somewhat different set of four categories: *habucha*–stuttering; *habuting*–lisping; *tlatlachin*–'collapsed speech'; *ninichin* –talking through the nose ('just like those Swedes'). There remains some confusion in our minds as to which of these is cleft palate speech, although we are inclined to believe that the defect designated as *ninichin* may well be the one.

[2] The similarity between this word and that used by the Comox may be accounted for by the fact that these tribes are all one linguistic group. They say they 'speak the Comox language.' The Comox proper differ somewhat in slurring sounds, however, having fewer sharp breaks.

Cultural Aspects of Stuttering

The attitudes of the coastal Indians in the North Pacific towards stutterers range from serious to mild disapproval, through humorous tolerance to pity and condescension. Of all the coastal peoples, the Nootka provide us with the most abundant evidence of the social penalization of persons with physical and speech defects. In this culture, fat persons, very small persons, sore-eyed, squinting, cockeyed, hunchbacked, lame, circumcised, left-handed people and those with speech disorders became the object of pity, mockery, satirization, humor and patronage of the sort shown small children. This is most apparent in the myths of the Nootka but emerges with equal clarity in associations of animals, mythological characters and defective persons with various linguistic and stylistic processes involving the symbolic use of sounds. Thus when a person who had a speech defect was addressed or talked about his defect was imitated or mocked, with changes in word forms, such as suffix changes, being made which carried implications of smallness, childishness, animal quality or of some physical defect.

While we do not know whether similar adaptations in discourse about or with stutterers characterize the other tribal languages in the area, nevertheless a content analysis (*4*) of myths occurring throughout the broader culture area of the Northwest reveals much social rejection and social isolation of child, adolescent and adult deviants such as orphans, crippled, blind, stupid, dirty, lazy, weak, and those with scabs or skin diseases. Such myths tend to be analogues of the success stories of our own culture and have been equated with the Cinderella theme in Grimm's fairy tales. Typically these pariahs are abandoned by their own people, following which they isolate themselves in the bush, then return to perform some heroic feat which re-establishes them as wealthy, prestigeful persons in their band. While stutterers are not mentioned in any of these myths, we found in several of the freely associated stories written for us by residential school children equivalents of Horatio Alger-like stutterers who are socially rejected, become socially isolated, and then overcome their defect to go on and become famous. The sensitivity of these elementary school children to public opinion in relation to speech inadequacy was unmistakable.

On the whole the rejections and penalties of stuttering in the Northwest Coast cultures were informal rather than formal. In one case we were told that among the Tsimshian in the old days boys who stuttered were compelled to take a back seat in the potlatch ceremonies; however, this was the result of decisions by the families of the youngsters involved rather than the consequence of a formal rule to the effect. Support is lent this conclusion by the replies of several Kwakiutl to our inquiry as to whether a member of their family who stuttered was ever insulted publicly. The answer was: 'No—but then everyone knows he stutters and we know that they know.' Furthermore, accounts were supplied us of several Nootka stutterers who had given potlatches despite their defects.

The competitive emphasis throughout the cultures of the Northwest Coast was such that the defects, inadequacies or mistakes of individuals might at any time become the subject of verbal aggression, insult, trait names and humorous gossip—espe-

cially the latter. The vulnerability of the individual to these was at the same time the vulnerability of the group with which he was identified. In tribes having clan organization the whole clan stood to lose status or prestige through aspersions cast upon its members because of their shortcomings; in others it was the family which suffered. This made the clan or family particularly sensitive to the deviations of its members and led to exacting educational practices.

The rigorous child-training procedures held especially where participation in feasts, potlatches and associated rituals was demanded of the individual. In order to achieve the imperative solemnity and precise decorum at these sacred winter festivals small children on certain occasions were subjected to gross, fear-inducing experiences such as being kidnapped, supposedly eaten by wolves, being made sick by shamans, swung back and forth over the fire, or thrown into the ocean. Although parents were not responsible for those ordeals and seldom used physical punishment, they worked constantly with very small children to teach them their sacred songs and dances and to indoctrinate them with values of the adult culture. At very early ages (as early as six or seven years) children were often compelled to sing and dance before watchful, critical audiences composed of rival bands and tribes as well as of members of their own village band.

From what has been said and from other interview data we cannot introduce here it is plain that the cultural and sociopsychological prerequisites for the development of stuttering were strongly operative in the Northwest Coast. Thus we have (1) the cultural recognition and symbolizing of stuttering, (2) social penalties for the disorder, (3) specific anxieties about the speech development of children on the part of parents, and (4) internalization of sensitivity about speech in both the child and the adult.

On first impression, our data would seem to contradict the conclusions of Johnson, Snidecor and Bullen that stuttering is extremely rare or absent among American Indians. Indeed, so stated, these conclusions are negated by our research. There is little reason to doubt the claim, however, that stuttering does not occur among the Bannock and Shoshone, the tribes in which Johnson and Snidecor conducted their field investigations. The error was to generalize about the 'American Indian' on the basis of this limited sample of a quite heterogeneous universe of cultures. Variation between American Indian cultures, it must be noted, may be as great as that between a given native culture and our own dominant White culture, at least in certain features having to do with participation of children in the adult culture.

The Bannock and Shoshone cultures show little in common with the complex and ceremonially rich social organization of the Indians of the Pacific Northwest. The former are variants of Plains Indian cultures, involving nomadism, periodic dispersion into small groups, plus integration around buffalo hunting and skirmish warfare. More directly to the point of our interest the Bannock and Shoshone peoples appear to have made few stringent demands upon the growing child until the time of adolescence. The moralistic and didactic elements of stories told to Shoshone children were only incidental and tenuous at best. Participation in dance ritual was permissive rather than compulsory for the child.

Of course, certain kinds of child deviants received cultural recognition from the Shoshone: twins, epileptics, feebleminded, berdaches, ninimbric sprites, those who were tongue-tied and also deaf mutes. Furthermore, persons outside the family group mocked these infirmities. In decided contrast to the Northwest coast culture, however, no interfamily nor interclan relationships complicated the family treatment of abnormal children. Family attitudes are portrayed as kind, helpful, sympathetic, and although protective are not overprotective. Shimkin cites cases of both tongue-tied individuals and deaf mutes who grew into reasonably well integrated and happy adults in Shoshone society.

In conclusion we may say that comparative data from *particular* American Indian cultures tend to support rather than refute the general socio-psychological hypotheses of stuttering proposed by Johnson, Snidecor, Van Riper and others.

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The Efficiency Of The Massachusetts Pure Tone Screening Test As Adapted For A University Testing Program

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THE NEED FOR quick and accurate measurement of auditory performance with stimuli of specific acoustic values has been recognized by otologists, educators, industrialists, and the armed forces. The contribution of modern electronic research, the development and refinement of techniques and procedures has facilitated and expedited both individual and group testing. Long before the 1920's Goldstein (*8*) became vitally concerned with problems of deafness. In the early 1920's Goldstein, Fowler, Fletcher and others began shifting the emphasis to the preventive aspects of hearing impairment. These men strongly believed early detection and medical rehabilitation of school children with hearing losses would reduce the incidence of adult deafness.

From coin clicks, voice, and tuning fork tests, there has been a steady modification and adaptation of pure tone audiometry to large populations (*4*). Hearing testing of large populations requires the use of efficient group screening tests. Individual audiometric testing of large groups becomes expensive and time consuming. Nevertheless, group tests which fail to discriminate adequately between significant and non-significant hearing loss, or misclassify hearing responses so that excessive retesting becomes necessary defeat the objectives of a sound testing program. Under such conditions group testing not only becomes expensive and time consuming, but also inefficient, with serious psychological implications.

The phonograph audiometer, presenting progressively attenuated number groups as auditory stimuli, has been and is still extensively used in testing hearing of school children. In those school systems which have hearing conservation and aural rehabilitation programs, the administration of group hearing tests for early detection and medical referral are administered periodically. Some states have provided legislation for periodic testing and reporting of school children with defective hearing. Industry has recognized the necessity for periodic group screening testing programs where high noise levels create problems of damage to hearing and inefficiency of communication.

Evaluation of the efficiency of the phonograph audiometer testing has revealed certain inadequacies. Car-

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hart (*3*) and others (*17*) have come to realize that group speech tests may not screen out those individuals with high frequency losses. The ability of the individual who has learned speech and language to capitalize on fragmentary speech cues introduces a source of error. For example, since the numbers range from zero to nine, the presentation of the vowel when the attitudinal set has been crystalized will permit the individual to guess at the right responses. As early as 1940 West (*18*), among others, believed it likely that a large number with significant hearing losses were not screened out by the fading numbers procedure. In addition, this type of test consistently fails individuals with normal hearing whose main difficulties are lack of coordination, language and writing ability.[1]

Gardner (7), Johnston (*9*, *10*) and Neilson (*13*) have adapted individual pure tone audiometric methods to group testing. Studies by Gardner (7), Newhart (*15*), and others have led to the conclusion that the pure tone individual sweep check test is an efficient instrument for screening populations. Nevertheless, there are certain disadvantages associated with this type of test: (1) It is more time-consuming, (2) a quiet room is a prerequisite, and (3) individual sweep-checks on large numbers, especially children, fatigue the operator.

Munson (*12*) as early as 1937 experimented with apparatus for group pure tone testing and Gardner (7) emphasized the pulse tone as a satisfactory technique for testing young children. At first the cost of the equipment was considered to be prohibitive. Johnston (*9*) devised the Massachusetts Pure Tone Screening Test for testing school populations. His study unequivocally reported the superiority of this type of test over tests using speech stimuli. Johnston adapted his test to include 40 matched earphones with a standard pure tone audiometer. Instead of pulses, Johnston administered the pure tone stimuli of consistent selected intensities. He calibrated his equipment to compensate for ambient noises and resistences in his receiver system. He presented stimuli of 512, 1024, 4092, and 11,584 cps at predetermined intensity levels. The subject indicated whether he heard the stimuli by marking the *yes* or *no* option on his paper. Six trials were presented for each frequency. Johnston's master sheet provided a ready criterion for comparison. In this way the tester could determine by a quick glance at the paper whether the child had failed. The statistical data from this experiment revealed the test to be superior to the group phonograph test in two ways: first, it screened out more effectively those persons with defective hearing loss; second, it reduced the number of retests to a reasonable proportion.

Present Study

In the fall of 1947 the hearing of all incoming students at Syracuse University was tested routinely as part of the annual freshman testing program. The phonograph audiometer with the fading numbers record was used. The testing room was a moderately quite one, but even though only a few subjects had not had the test before an excessive number of individual retests was necessary. The results were so inconsistent that the group phonograph audiometric test

[1] The writers have found the fading numbers group test unsuited for screening cerebral palsied and mentally retarded children.

had to be abandoned for screening purposes. The individual pure tone retests revealed that the group test was failing an excessively large number of this college population with normal hearing. Later in the year the University Health Center referred a number of students with significant hearing losses for rehabilitation. A check of the records revealed that these people had been passed by the group test.

In the fall of 1948, individual pure tone screening tests were administered. Although this was more satisfactory than the fading numbers test, the cost and the time were too great. In 1950, the Massachusetts Group Pure Tone Test was adopted. The results indicated that further refinements were necessary. Specifically, a large number of individuals failed at 500 cps who were found to have satisfactory responses at that frequency in the individual test.

In 1951, Becker (*1*) compared the efficiency of the group and individual tests. His conclusions were that:

1. The Massachusetts test is basically an efficient tool for screening large groups as indicated by the high degree of correspondence between the group and the individual test in each of the frequencies tested.

2. Certain administrative precautions, especially with respect to instructing the subjects, must be carefully controlled.

3. A 10% limit for errors appears too strict; 15 to 20% seems a more realistic limit.

With these suggestions in mind, the Massachusetts Group Pure Tone Hearing Test was adapted and administered in the Syracuse University hearing and speech testing program. Johnston (*9*) calibrated his system by the loudness balance technique, matching his group receivers as indicated in Table 1. In the present test final attenuator value settings were calculated by testing of eight normal hearing subjects. Threshold values at each frequency for these eight individuals were obtained. The eight individuals were seated in different places in the setup and were instructed to raise their hands upon detection of the signal tone. The responses indicated that all the listeners heard the signal tone at the same level. This level was noted and the signal level was increased by 15 db's for the screening purposes. The rationale for setting up this criteria was suggested by the critical intensity level advocated by the Committee on the Conservation of Hearing of the American Academy of Opthalmology and Otolaryngology. Other investigators, Dedominico (*5*) and Kiser (*11*), also advocated such a criteria. Newby (*14*), Peterson (*16*), and others favored a 20-db criterion.

TABLE 1. Critical intensities used in the Massachusetts Pure Tone Screening Test.

Frequency	*Attenuator setting in db*
512	20
1,024	25
2,048	25
11,584	30

A second modification applied to the signal tones. Johnston tested his subjects at 512, 1024, 4096, and 11,584 cps. The adopted signals were 500, 1000, 2000, and 8000 cps. Another modification included five options for each frequency rather than six as required by Johnston's test. Johnston's techniques, forms and score were used in the test situation.

Individuals failing at any one frequency in the group test were considered as failing the test. They were given an individual audiometric test. The criteria for failing the individual was established at 15 db for two frequencies and 20 db for one frequency.

TABLE 2. Mean ambient noise levels of testing rooms calculated on readings with General Radio sound level meter with setting at the A position.

Group testing room	45 db
Testing room 1	32 db
Testing room 2	35 db
Testing room 3	36 db

Procedure

A total of 1754 new students were tested in September, 1951. Using the individual test as criterion, Newby's (*14*) values were accepted as indicating adequate performance. Two groups, one classified as having significant hearing loss and the other as having essentially normal hearing by the group test were reexamined. The two groups comprised the 127 individuals (88 males, 39 females) who failed the group test and an approximate 12% random sample of 188 individuals (99 males, 99 females) from among the remaining 1627 subjects passing the group test.

Individual pure tone audiometer tests were administered to both groups. Consequently, 630 ears were tested. The tests were conducted in relatively quiet rooms by individuals who had training and experience in audiometric techniques. Table 2 indicates the mean ambient noise levels of the testing rooms as measured by a General Radio sound level meter Type 759-B. Eight readings at different intervals of the day were taken for each room. The individual tests were administered on the ADC model 50-C2, Maico E-2, and Sonotone model AE-21 equipped with model 244 receivers.

During the test, the noise level outside the testing room was kept at a minimum by monitors who directed the subjects to waiting rooms some distance away. The tester listened through one of the receivers constantly to make sure that test conditions were optimum. Pre-test instructions were given in an adjoining room.

Analysis

Several procedures suggested themselves for analysis. The analysis used in this study is similar to that used by Brigance (*2*) and Becker (*1*). Figure 1 reveals the accepted hypothetical criteria of values adopted. Newby (*14*) suggested this criteria and felt that a test that misclassified 10% of the hearing losses erroneously is satisfactory, and that for the margin of error in terms of failing to detect hearing, 5% would be satisfactory. With respect to cell *C*, such a criteria would be acceptable, but with respect to cell *B*, the closer the limit approached to 0% the better would be the test instrument.

The purpose of the study was to compare the group audiometer to the individual threshold test at the four frequencies measured by both instru-

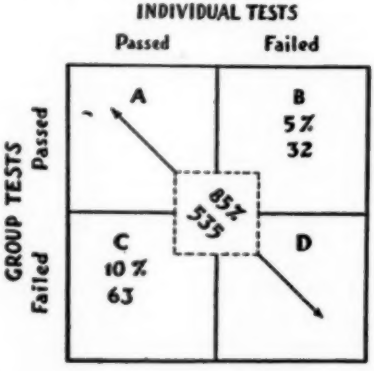

FIGURE 1. Accepted hypothetical criterion values representing agreement in classification of individual and group tests for 630 ears.

TABLE 3. Values representing agreement and disagreement in classification between group and individual tests at frequencies of 500, 1000, 2000, 8000 cps and total test for 630 ears.

		Passed both group and individual tests	*Failed both group and individual tests*	*Passed group but failed individual tests*	*Failed group but passed individual tests*
500	Cell	A	D	B	C
	N	584	23	5	18
	%	92.7	3.6	.8	2.9
1000	Cell	A	D	B	C
	N	585	24	7	14
	%	92.9	3.8	1.1	2.2
2000	Cell	A	D	B	C
	N	574	33	7	16
	%	91.1	5.2	1.1	2.5
8000	Cell	A	D	B	C
	N	478	107	10	35
	%	75.8	17.0	1.6	5.6
Total Test	Cell	A	D	B	C
	N	451	124	16	39
	%	71.6	19.7	2.5	6.2

ments, and to compare the group test as a whole with the individual threshold test as a whole. Table 3 presents the actual distribution of the performances in the different cells. Observation of the distribution reveals that both cell *B* and cell *C* values are lower in the actual test results than the hypothesized criteria. Table 4 presents the actual distribution of the performances in the different cells. Observation of the distribution reveals that both cell *B* and cell *C* values are lower in the actual test results than the hypothesized criteria. Table 4 presents the classification of responses into categories of agreement and two possible types of disagreement. Chi-square's were computed from the data presented in Table 4. In all of the test results the agreement was much greater than the postulated criteria and the disagreement was considerably lower.

At 500 cps the group test misclassified 23 ears, or 3.6% of the total sample of 630 ears. Eighteen, or 2.8%, failed the group test but revealed no significant losses upon individual pure

TABLE 4. Classification of responses of 630 ears tested by group and individual tests.

Frequency in cps	*Tests agree*	*Passed group but failed individual tests*	*Passed individual but failed group tests*
500	607	5	18
1000	609	7	14
2000	607	7	16
8000	585	10	35
Total Test	575	16	39

tone testing. Although these ears were needlessly retested, they were all below the postulated 10% criteria. The remaining 5, or .8%, were found to have significant losses which were not detected by group audiometry. An instrument devoid of any margin of error would approximate zero. But .8% is as low a margin of error as might be expected under very satisfactory test conditions.

At 1000 cps, 609 ears, or 96.7%, were classified correctly while 21 ears, or 3.3%, were misclassified. Of these, seven passed the group test but were found to have significant losses. Analysis of the total picture reveals that the actual results extended in agreement with the hypothetical criteria while the disagreement categories were very much lower than the hypothetical limits.

At 2000 cps, 607 ears were correctly classified, while 23 ears were misclassified. Seven of these, or 1.1%, were distributed in cell *B*. These seven ears were much lower than the hypothetical criteria decided upon. All of the totals at this frequency were much better than the limits postulated at the hypothetical criteria.

At 8000 cycles, 585, or 92.9%, ears were correctly classified, while 45, or 7.2%, were misclassified. Ten, or 1.6%, of these fell in cell *B*. The actual results at the frequency were much better than the postulated criteria.

A comparison of the results between the group and the individual test as a whole revealed 575 ears, or 91.1%, were correctly classified, while 55 ears, or 8.9%, were erroneously identified. Sixteen of these ears, or 2.8%, were passed by the group test but found to have losses on the individual testing, while 39 ears, or 6.1%, had to be needlessly retested. A comparison of the group and the individual tests as a whole indicate that even here the results were much better than the hypothetical criteria.

Inspection of the results at different frequencies reveals an accumulative factor. The explanation is, of course, that the total test results in-

TABLE 5. Chi-square, degrees of freedom, and probability values for each frequency and for total test. (N=630)

Frequency of signal tone in cps	*Cell*	*Observed frequency*	*Theoretical frequency*	*Chi-square*	*Degrees of freedom*	*p*
500	AD	607	535	64.61	2	<.001
	B	5	32			
	C	18	63			
1000	AD	609	535	67.88	2	<.001
	B	7	32			
	C	14	63			
2000	AD	607	535	64.28	2	<.001
	B	7	32			
	C	16	63			
8000	AD	585	535	32.24	2	<.001
	B	10	32			
	C	35	63			
Total Test	AD	575	535	20.13	2	<.001
	B	16	32			
	C	39	63			

TABLE 6. Critical ratios for differences between percentages of observed agreement and a priori theoretical percentages of agreement. (N=630)

Frequency of signal tone in cps	*Cell*	*Observed percentage*	*Theoretical percentage*	*Critical ratio*	*p*
500	AD	96.35	85	7.99	<.001
1000	AD	96.67	85	8.22	<.001
2000	AD	96.35	85	7.99	<.001
8000	AD	92.86	85	5.55	<.001
Total test	AD	91.27	85	4.44	<.001

clude some of the failures at two or more frequencies.

Chi-square and critical ratios were used as statistical tools to determine the significance of the differences between the hypothetical criteria and the actual test results. Cells *A* and *B* were combined since those indicated agreement. Cells *B* and *C* were not combined since they report two different types of disagreement. This type of measurement permits the investigator to determine whether the deviation of the obtained data from the hypothesized criteria is greater than could be obtained by chance factors. Table 5 presents the chi-square, degrees of freedom, and the probability values for each frequency and for the total test for 630 ears. The chi-square values indicate that the agreement between the group and the individual tests is much higher than would be considered acceptable on the basis of the critical limiting values defined by the postulated criteria. At all of the frequencies including the total test, the degree of significance is less than .001 level of confidence. While Table 5 reveals the relationship between the two tests to be greater than could be possible by chance factors, nevertheless it was desirable to analyse statistically the relationship between the obtained results and the hypothesized criteria. Table 6 presents the critical ratios for differences between percentages of observed agreement and a priori theoretical percentage of agreement for 630 ears. For all the frequencies and the total test, the critical ratio values compel the rejection of the null hypothesis. For the 500, 1000, 2000 cps signal tones probability values are less than .001. At the 8000 cps and the total test, the probability values are less than .001.

Discussion

A comparison of the actual results and the hypothesized criteria revealed that the actual results were much better than the a priori established criteria. There was much less retesting than had been anticipated. Moreover, fewer ears were passed in the group test but failed the individual test. The test succeeded fairly accurately in separating subjects with significant hearing losses from those with essentially normal hearing. In addition, the distribution in cell *B* was minimized. While the value in cell *B* may approach zero, it is very questionable that the value would ever reach zero unless the criteria were made much more stringent. If further restrictions were imposed upon the criteria, it might reduce the distribution in cell *B*, but would nevertheless

be commensurate with the distribution in cell *C*.

Further analysis considered examining the results of the 250 and 4000 cps signal tones on the individual tests since those were not tested on the group tests. Of the 107 subjects that failed both group and individual tests, 27 of those also revealed losses at 4000 cycles. Of those 27 subjects who had losses at the 4000 cps signal tone, only three had losses at 2000 cps. This would indicate that examining the 8000 cps signal tone gives a more accurate indication of the hearing status of the 4000 cps than using the 2000 cps signal tone. Of the 23 who failed both tests at the 500 cps, 12 were found to have losses at 250 cps also.

Evaluation of the results clearly establishes the efficiency of the Massachusetts Group Pure Tone Test as applied in the Syracuse University testing program. Such efficiency depends upon (1) carefully planned administration of the program, (2) adequate structuring of the test situation, and (3), most important of all, a relatively quiet room.

Conclusion

In terms of time, cost, and the results, the Massachusetts Pure Tone Group Test as modified, and when administered under the conditions suggested above, provides a very efficient testing tool for hearing testing of university populations.

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Letters To The Editor

SIR:

It would be appreciated if you would be willing to print this as a letter to the Editor.

Most psychologists have noticed a quickening interest in communication problems during the past few years. It has been evident in the content of papers and symposia presented at APA meetings, in the setting up of both graduate and undergraduate courses, and in articles appearing in our journals—a recent issue of the *Psychological Review*, for example, included four papers on as many aspects of language behavior. The same trend is apparent in other fields, in education, sociology, anthropology, psychiatry, and even neurophysiology. The contributions of mathematicians, engineers and others to the development of 'information theory' are well known and are responsible to no small degree for the contemporary rebirth of interest in communication research.

For the most part, these recent developments have taken place without contact with linguists. Not only is this surprising, since linguistics is the science most directly concerned with structure of messages, but it has resulted in considerable naivete in the design and interpretation of research on language behavior. The stereotype of the linguist held by many social scientists—that he is simply a polyglot or perhaps a philologist—is partly responsible for this situation. As a matter of fact, linguists have developed tools for the descriptive analysis of languages which for their rigor and exhaustiveness put us to shame when compared with our own techniques for describing behavior. Another reason for this situation is that to date communication channels between linguists and other social scientists have for the most part been unavailable. Evolving as specialists within language departments, linguists have generally found professional organization within the humanities and have participated in research and planning groups sponsored by foundations other than those supporting the social sciences. One exception to this has been the close and fruitful collaboration among linguists and anthropologists; another was two conferences between linguists and information theorists held recently at the Massachusetts Institute of Technology; and yet another was the Interuniversity Summer Research Seminar on Linguistics and Psychology sponsored at Cornell University by the Social Science Research Council in 1951.

One of the concrete proposals of the Cornell Seminar was that the SSRC set up a committee to survey, stimulate, and aid research in those social science areas bordering on linguistics. Further impetus to this proposal came from a group of linguists, anthropologists, and psychologists meeting together at a Fortnight's Conference of Anthropologists and Linguists held at the Linguistic Institute, Bloomington, Indiana, and cosponsored by Indiana University and the Wenner-Gren Foundation. In October, 1952, the Social Science Research Council established a 'new Committee on Linguistics and Psy-

chology . . . to plan and develop research in the field of language behavior.' The members for 1952-53 are John B. Carroll of Harvard University (psychologist), Floyd G. Lounsbury of Yale University (anthropologist and linguist), George A. Miller of the Massachusetts Institute of Technology (psychologist), Charles E. Osgood of the University of Illinois) psychologist, chairman), and Thomas A. Sebeck of Indiana University (linguist), with Joseph B. Casagrande (anthropologist of the Council's Washington Office serving as staff representative.

While it is impossible to foresee the exact course this Committee will take, at least the following types of activities have been initiated or are felt to be appropriate: (1) The Committee will conduct a survey of on-going and contemplated research in language behavior, aimed at an inventory of trained personnel, existing and needed techniques, and potentially fruitful research areas deserving support. (2) It hopes to organize and support a number of small-scale work conferences of 2-4 days duration on special problems among research workers with confluent and mutually interdependent interests, who would otherwise find little opportunity for such cross-area stimulation and sharing of skills. (3) The Committee may, as its program develops, wish to plan and give general supervision to one or more major pieces of research and give aid in the preparation of special studies. (4) It can serve as a communication channel between research workers in these areas and possible sources of support and, in this connection, can serve as a specialized evaluation board for research proposals falling within its competence. (5) It will attempt, both through work conferences and encouragement of inter-disciplinary training of graduate students, to develop teachers and investigators who are reasonably competent in both linguistics and one or another of the social sciences. (6) Drawing both on its own membership and on invited participants, this Committee will examine various theoretical models of the language process, including linguistic, learning theory and information theory models, with the purpose of determining their points of commonness and uniqueness and of appraising their utilities in handling various language problems.

As stated above, one of the first goals of this Committee is to compile an inventory of on-going and contemplated research in the general area of language behavior. Such an inventory is prerequisite to intelligent planning of work conferences and support of research activities. *The Committee on Linguistics and Psychology therefore takes this opportunity to invite both those who are themselves engaged in or planning research on language behavior and those who know of such activities at their own institutions to communicate this information to the committee.* We would like to know the general nature of the research, the principal investigators, and the institution where the work is being carried on. Further details will be solicited by the Committee as the need arises. This information may be sent to either the chairman (C. E. Osgood, Department of Psychology, University of Illinois, Urbana), or the staff representative of the committee (J. B. Casagrande, Social Science Research Council, 726 Jackson Place, N.W., Washington 6, D. C.). Any suggestions as to how this committee can more

effectively achieve its goals will also be warmly received.

CHARLES E. OSGOOD
University of Illinois

SIR:

The basic issue raised by Dr. Brown's editorial is: Is speech therapy a 'therapy' process or an 'educational' process? Should speech therapists be considered, in other words, under the same general classification as physicians, dentists, nurses, etc., or should they be considered as teachers differing from other teachers only in the content matter of the subject they teach?

Dr. Brown apparently believes that speech therapists are 'therapists' and not 'teachers' but perhaps most of his fellow ASHA members are not aware that the decision to be 'therapist' or 'teacher' has never been made by the field of speech therapy. University staffs now training speech therapists are undecided about this point and seem to prefer to ignore it altogether. Dr. Brown's editorial will have served a very useful purpose indeed if it forces us to think about this issue and decide whether we want, as a field, to orient to the 'therapy' end of the continuum or the 'educational' end. Only after we have decided our role and understand it can we interpret our field to others with any unanimity.

As Dr. Brown pointed out, some of the earliest speech therapists were interested teachers who worked with children with speech disorders on a part-time basis. Speech therapists are still known as 'speech teachers,' 'speech correctionists,' 'teachers of speech correction,' etc. The speech therapist holds 'classes' in 'classrooms,' she is taught how to make 'lesson plans' and the children with whom she works are called 'students' or 'pupils.' These terms were not foisted on speech therapists by people in education, but are used by speech therapists to designate themselves and their activities. This is the lexicon used in the average speech clinic engaged in training therapists.

Speech therapy programs in public schools are frequently financed, moreover, by 'special education' appropriations and are supervised by 'state supervisors of special education' along with sight-saving teachers, teachers of retarded children and teachers of remedial reading. Speech therapists used to be paid a teacher's salary plus several hundred dollars, but the trend in recent years is to pay speech therapists on the same wage scale as teachers. Speech therapy has gained its tremendous impetus and present healthy growth largely because hundreds of speech therapists are used in public schools and, as mentioned by Dr. Brown, the demand for speech therapists is exceeding the supply at present. One question our field must decide is: Does it really want to bite this breast at which it has nursed for so long?

Speech therapy, it must be recognized, is growing up. It has changed much in the past 20 years and even in the past 10 years. Modern speech therapy, at its best, has progressed far beyond the speech teacher in its techniques and training and is no longer just a matter of 'exercises,' 'drills' or of 'changing speech habits.' It is a *treatment* process, a kind of therapy that concerns itself as much with the emotional adjustment of the child as it does with the specific speech, voice, or language disorder. It is interested primarily in how the

child *feels* about himself and his disorder and in promoting increased feelings of adequacy in social situations. Accuracy in speech production and normalcy in speech, voice and language behavior are important too, but the modern speech therapist recognizes that these secondary goals can be achieved more quickly and efficiently if he works first with the parent-child relationship and the child's attitudes about himself. Speech therapy has been working toward these goals for a long time and the field as a whole is just beginning to understand the irrational elements in speech, voice and language disorders and to realize the necessity for giving therapists more than 'methods' courses.

Tremendous strides have been made in the training of speech therapists in the last 20 years but we still have a long way to go if we consider speech therapy as a form of 'treatment.' The majority of speech therapists today are in the unique position of being constantly thrown into emotionally charged and potentially psychotherapeutic situations without more than the barest knowledge of personality structure and effective psychotherapeutic methods and techniques. They must deal with very potent material with pitifully little equipment. Those speech therapists who are effective are either 'natural' therapists or are products of a relatively new school of thought which recognizes the necessity for equipping the speech therapist with some of the best techniques of clinical psychology and other disciplines. Not one speech therapist in 10 knows the difference between a psychologist and a psychoanalyst. Speech therapists need not be qualified psychometricians but most speech therapists today cannot use and understand the results of psychological tests administered by others. It is hard to believe some of these things until you watch speech therapists in public schools struggling with children who are borderline psychotics, or who are brain injured or severely retarded. The speech therpist is often totally unaware that these children are anything more than 'simple artics.'

We pay lip service to the concept of the 'whole child' but I am convinced a speech therapist can't do much more than keep up with the rat race when she must see 150-200 children a week, as she must in many public schools systems. Our literature contains many articles about the need for counseling parents and helping to change the emotional climate of the home, yet we allow public school speech therapists only one-half day a week for this important activity. These schedules, it should be remembered, were probably originally set up by speech therapists and have only been perpetuated and rigidified by school administrators.

What courses should be substituted for education courses, in the unlikely event that all education requirements are lifted suddenly? If our present approach to teaching speech therapists is continued, it is very likely that one 'how to . . .' course will be substituted for another—perhaps 'How to correct sibilants in the second grade' will be substituted for 'How to teach history in the eighth grade.' Thus the present 'cook book' approach to speech therapy will be continued and our therapists will be no better prepared than they are now.

So there are many questions to be answered before we challenge the role in which we are now cast in the educational system. We need, first of

all, to examine our own field carefully and try to decide what speech therapy is. Is there anything unique about speech therapy that distinguishes it from teaching slow learners, teaching remedial reading, teaching the deaf? What is the present status of our training of therapists and what kind of training do we want these therapists to have in the future? At the present time the largest number of speech therapists are employed in public schools and we train therapists with the public schools in mind. Many hospitals and other medical facilities are without speech therapists—do we want speech therapists in these facilities and what kind of training should these therapists have? The present insatiable demand for therapists can be dangerous if we just concentrate on grinding out therapists with no thought about the directions we want our field to take in the future. It's time we take a long, hard-headed look at speech therapy as it now is practiced and decide on a blueprint for the next decade, at least. This blueprint will not be an easy job or one that will be finished in a hurry, but unless we take the initiative in mapping and shaping our role in the sciences of behavior, we can be sure that someone from outside of our field will do the job for us. When we have reached some general agreement about what speech therapy is and where it is going, we can interpret our field to others with the assurance that many other speech therapists share our frames of reference.

My personal bias in these matters is evident by now. It is obvious to me that the exciting challenge of the future lies in the recognition of our therapeutic role and in our struggle to establish a secure position as one of the healing arts. This need not necessitate any sharp breaks with our past or present. Our field is still so new and the need for our services so urgent that others, including school systems, will accept speech therapy at whatever value we place on it. We must be willing to fight for our 'place in the sun,' of course, but any real friends we now have will only be pleased by our efforts to clarify our role and improve our training facilities so we can render more effective speech therapy.

JOHN L. BOLAND, JR.
University of Oklahoma

SIR:

This is written in response to the Editorial written by Dr. Spencer Brown which appeared in the September 1952 issue of the *Journal of Speech and Hearing Disorders.*

Those who have never directed a public school speech correction program do not realize how much it means to all concerned to know that the speech clinician is first of all a qualified teacher; that he is familiar not only with the Laws of Learning, and has at his command a fund of methods and techniques, but that he knows how to apply these techniques to the best advantage. He must realize the need for adaptation to a wide range of chronological ages, mental ages, and types of personalities. This involves a real understanding of children. I say 'children' because the largest proportion of speech defects is found among children below 12 years of age. The speech clinician must understand the significance of attitudes and overt behavior, and must know how to bring about desirable changes. In many cases a seemingly simple functional speech disorder is tied up with attitudes and

behavior that must be changed before a permanent eradication of the speech defect is accomplished.

Classroom management also enters into the picture. It requires special training to keep every member of a group actively participating while individual help is being given to a child within that group. The time is wasted for all if the clinician constantly interrupts what he is doing to reprimand a child for poor behavior, or if the attention of the members of the group is distracted by an uncooperative member. The skilled teacher prevents these situations from arising.

Should it then be difficult to explain to a student planning to be a speech clinician in a public school system why he must register for Methods of Teaching in the Elementary School? To eliminate this requirement would simply duplicate the problem existing in our schools today, where teachers trained for secondary school teaching, when recruited to fill elementary school vacancies, lack the ability to apply their knowledge to the advantage of the pupils in their care. Ask any elementary school principal about this.

The amassing of a great fund of factual data relating to speech defects, and the ability to write comprehensive case histories, does not insure the ability to correct speech defects, or to inspire the individual with the disorder to assume his share in the correction. Probably most of you who read this article can recall at least one of your college professors who, although fully in command of the data pertaining to his subject, lacked the ability to project that knowledge to his students. Knowledge of a subject does not generate the ability to teach.

Specialized knowledge must be superimposed upon this basic training as a teacher if one is to attain the maximum in favorable results. Training in a college speech clinic alone is not sufficient. Here experience is usually with individual cases. If there *is* a group, the pupils have been accompanied by their mothers on their visits to the clinic. The cooperation of the mothers is sought in applying the speech therapy.

In a public school the speech clinician selects most of his cases as the result of a screening survey. He forms his classes around recess periods, assembly periods, and special events, with consideration for both the program of the classroom teacher and of the pupil. He, too, seeks the cooperation of parents, but he depends also on the cooperation of the classroom teachers. The speech clinician in a public school considers himself a teacher in the schools to which he is assigned (a special teacher, to be sure) and he knows that his program must fit harmoniously into that of the rest of the school. He is subject to the same rules and regulations as the other teachers.

In addition to the direct service to those who have severe speech defects, he serves as a consultant for the classroom teacher by suggesting ways of helping the many pupils with minor deviations in speech. It takes a real understanding of the classroom teacher's problems to make these suggestions practical, and to insure cooperation. The success of the clinician's work depends in no small degree upon the rapport established with the principal and the rest of the faculty. The Board of Education that employs him is doing so with the understanding that he will apply his knowledge to the best advantage for the greatest number possible.

The position of speech clinician is not analogous to that of the doctor, nurse, or psychologist employed by the schools. The doctor and nurse may diagnose, but they administer little, if any, treatment. The psychologist examines and makes recommendations for one child at a time, but he does not attempt to apply any specific teaching methods himself. None of these clinical workers attempt to correct what is wrong with the pupil.

Neither is the position of speech teacher similar to that of the teacher of instrumental music. Both are specialists, but the teacher of instrumental music gives appropriate instruction to those who report to him, and then leaves. There is no need for him to consult the classroom teacher, to advise him, or to ask that he help Johnny to establish the habit of producing a particular sound correctly. Speech teaching is a different matter. The pupil talks many times during the course of a day. Without the understanding cooperation of the classroom teacher he may relapse into former habits of speaking, and render void the efforts of the speech clinician. One of the attitudes we struggle to break down is: 'Let the specialist do it.' The specialist cannot be successful alone. The skilled speech clinician helps the classroom teachers to understand the speech handicaps of their pupils, and seeks the cooperation of these classroom teachers in establishing the habit of using correctly sounds already learned.

It would help considerably if state requirements were uniform. It is disconcerting to a speech teacher fully certified according to the requirements of one school system, to move to another state and find that he does not meet the requirements there. The school system may lose many fine speech therapists in this way, as the young applicant must earn a living and he therefore turns to a position in some other field, at least until he earns enough to take the additional courses.

Perhaps a solution of the problem of training would be a regrouping of teacher training courses so that basic courses are required of all teachers and followed by the choice of certain blocks of courses in particular areas: Speech, Hearing, Music, Art, Regular Grade. It is highly desirable that specialized training in the fields of speech and hearing be made uniform throughout the United States. All teacher training colleges should make it possible for those planning to enter these fields to meet the requirements for the Basic Certificate as set up by the ASHA. At least part of the practice teaching required of these students should be in speech classes in the public schools. It should include observation of these pupils in speaking situations in the regular classrooms.

After appointment, constant growth in the chosen field through continued college training should be encouraged. In-service courses and reading programs should be set up for those who have had many years of experience, in order that they too may keep abreast of the latest research in the field.

Let us insure fruitful service on the part of the public school speech clinician by insisting that he be a well-trained teacher, as well as a fully-qualified specialist.

MARGARET MCCAUSLAND
Philadelphia Public Schools

SIR:

Since so many individuals representing bureaus of special education have commented on Dr. Spencer Brown's editorial, I wish to present my point of view as a speech thera-

pist teaching children with speech difficulties in a public school in Texas.

I wish to summarize briefly the path I followed to become a speech therapist. I majored in education at a teacher's college with speech and English as my major and minor teaching areas and with art as a second minor subject. My degree outline called for 24 hours in education, 33 hours in speech, (9 hours in drama, 12 hours in speech correction, 12 hours in general speech courses), 21 hours in English, and 18 hours in art. My practice teaching duties required me to teach a unit in debate. This work qualified me as a teacher of speech or English in the Texas Public Schools. It did not qualify me as a speech therapist, because I was not able to take enough courses in speech pathology before I was graduated.

I continued my education at the State University of Iowa majoring in speech pathology. There I received 38 credits and an M.A. degree. After taking courses in education, general speech, speech pathology, psychology, medicine, and art I cannot help but feel that I have received training that would classify me as a specialist regardless by what 'name' I were called by public school officials.

I had two years of teaching experience, one as an elementary teacher and one as a secondary teacher, before I became a speech therapist. This year I am completing two years of experience as a speech therapist in the public schools.

I well remember one of my professors informing the class that as private speech therapists we should charge from three dollars to five dollars an hour to be ethical. Rates much more than five dollars would be a bit too greedy and rates much less than three dollars would perhaps put us in the 'quack' category.

This year as a speech therapist in the Texas Public Schools, I have been paid $1.93+ an hour for my services as a 'teacher' of speech therapy. I feel that I have been given 'faith healer' pay for services and qualifications that far excell the training and qualifications of many classroom teachers. Although I do not mind being called a 'teacher,' I definitely do not like 'teacher' salary.

I am certainly proud of the type of work I have been trained to do, but if the name 'teacher' will put me in the $1.93+ salary level, I will soon have to look up with envy to the beauty operator who washes my dirty hair. Where is my reward as a 'teacher' of speech therapy in the public schools?

At the present only unmarried women who have a missionary spirit can exist on such meager salaries. How can young men who must support families be expected to train in speech pathology? I definitely feel that something must be done about this situation, unless we want only women as speech therapists in the public schools, or unless we expect teaching speech therapy in the public schools to be only a stepping stone on the way to a much more lucrative position.

La Verne Brodbeck
New Braunfels, Texas, Public Schools

Sir:

Great strength of feeling has been expressed by many persons in response to Spencer Brown's editorial on requirements for professional training of speech and hearing therapists. It appears, then, that Dr. Brown made an important contribution by raising openly an issue about which there has been considerable feeling for some time.

At the convention in Detroit I questioned numbers of people about their reactions to the editorial. The reactions varied along a continuum from strongly favoring to strongly opposing. These were expressed by people whom I respect both in regard to professional competence and personal integrity. When this issue was raised in the business meeting I urged that the matter be deferred, since it seemed probable that a consideration of it at that time would involve only the expression of conflicting evaluations. It seemed to me imperative that we not create barriers to communication on an issue about which we deeply need to become able to communicate.

This issue must eventually be resolved to the greatest possible satisfaction of the *whole* membership of the Association. That means it must become a discussable rather than a debatable subject—discussable in small groups such as the Clinical Standards Committees, in larger groups at state and regional meetings, certainly also in one or more business meetings of the whole Association. Meanwhile, the first step would seem to be for us as responsible members to work toward creating a psychological climate in which such face-to-face communication can become more possible.

This article represents my attempt at this date to contribute to the creation of such a climate. It has a four-point structure: (1) Eliminating evaluations of blame, (2) emphasizing areas of agreement, (3) seeking to understand another's point of view, and (4) clarifying basic issues.

Eliminating Evaluations of 'Blame'

It seems essential first of all that the relations among us should be made free, insofar as possible, from evaluations of 'fault' or 'blame,' both in respect to words uttered and/or attitudes held by us toward each other. In this respect I do not like the diagnostic character of two paragraphs in the Brown article (italics mine):

> This most explosive expansion has not occurred without creating important problems. A thoughtful look at these problems leads one to the conclusion that the most serious of them arise from requirements *imposed by state departments of education upon* speech and hearing clinicians and the school systems employing them.
>
> If these requirements were set up by speech pathologists they would probably be fairly uniform from one state to another, and *would certainly be realistically oriented in terms of the professional job* that a public school speech clinician does. What we actually find is that the requirements imposed upon public school clinicians . . . *quite obviously were set up by persons whose acquaintance with speech and hearing therapy is recent and largely by hearsay.*

These statements do not seem to me to be correct as generalizations. To the extent that they may be correct in certain cases, they imply a lack of faith in individual good intentions, ineffectual as past performances may appear in any given present. While it seems a legitimate enough use of the word 'imposed' to describe current practice in any field in requiring individuals to meet prescribed standards (ASHA included), the implication here appears to be that state departments of education *alone* did the drafting as well as the enforcing of the requirements.

I have scrutinized the history of this field as I have known it since my own contacts with public schools began in 1933. It is my remembered experience in several states that speech pathologists were consulted and had some share in setting up state requirements. In considering the 'almost explosive expansion' in our field in these

years, it seems really necessary to use that term also to describe our own growth inside: our changing conceptions about speech and hearing disorders, the process of therapy, the complicated job of educating speech and hearing therapists. When we look at requirements that we had a share in making even so recently as a couple of years ago, we realize that the best we knew then falls far short of adequacy now. Yet there seems no need of 'blaming' ourselves for doing the best we knew then.

Furthermore, in the early days when few jobs in speech therapy existed we were eager to get a 'toehold' in promoting the work and felt encouraged about any small stated requirement. Few speech pathologists had had knowledge or experience with public schools and were quite thoroughly dependent upon the advice of school administrators in drafting any requirements. Moreover, the college programs themselves usually consisted of but three or four courses, i.e., a total of but nine or twelve semester hours.

The various state programs today vary widely for a number of reasons: public school education in this country has been a function of the states and hence shows some variety; speech programs by and large have followed the development of strong college programs; they have been established at different times, and so reflect the stage of development of the whole field; these programs have also, indeed, been influenced by people in public school education.

It seems reasonable to assume that in no state are certification requirements considered ideal; that in many states they are considered greatly inadequate. They do represent, however, recognition by somebody in some time past that speech and hearing problems exist; they do represent effort by a number of people to have such problems met in some fashion at least. In the states with relatively adequate requirements speech pathologists, speech therapists in public schools and state department personnel collectively can feel proud; so in the states with grossly inadequate requirements all three groups can share *collective* responsibility, but responsibility without blame.

If we can consider the problem *in the present* without blaming each other for behavior in the past, it would seem possible for us to avoid certain barriers to communication.

Emphasizing Areas of Agreement

It seems evident that emphasizing areas of agreement among us will promote communication.

a. We share the feeling that this certification issue constitutes a serious problem demanding eventual solution. This is shown by the strength of feeling expressed, both by Dr. Brown in written form and by so many persons orally since.

b. We hold in common the value that human beings with problems of speech and hearing hearing have importance for us. The degree of directness of our contacts with such individuals varies. Nevertheless, by the very existence, rapid growth, and intensiveness of our activities in our various specialities, we indicate our agreement on this value, philosophically and/or practically.

c. We share the convictions that (1) the majority of children with such problems can be helped by speech and hearing therapy; (2) that their needs have not been met by mere school attendance without therapy; (3) that

public school education should provide such therapy. This is evident, again, from our various activities in therapy, professional training, research, and administration of state programs.

d. We share the beliefs that (1) the effectiveness of therapy is dependent largely upon the therapist, his knowledge implemented by his skills, (2) that many therapists have demonstrated highly satisfactory ability, (3) that many have not been so able, (4) that it is important to increase the number who have adequate skill. This is evident in our past and present interest in certification requirements both on the part of ASHA and state departments of education, in our increasingly rigorous programs of professional training, our increased interest in research, more adequate supervision of therapy in clinical work both in public schools and in other types of clinics, and in the caliber of our convention programs. We differ on how best to do the job, but we agree on the importance of it.

e. We share also some degree of trust in and professional respect for each other, even though we are engaged in different areas of the field and hence view important issues in different frames of reference. Undoubtedly such trust and respect are too little, but still we have evidence that some exists. More and more, state departments of education are adding to their staffs qualified speech and hearing therapists to administer their state programs. More and more, mature and competent persons are going into schools as therapists and supervisors; these are persons who have had advanced study both in clinical practice and research. More and more such individuals are being invited as guest lecturers and permanent staff members at colleges and universities to supervise clinical practice in professional training. In some of the more recent state programs licenses to practice in public schools are based entirely on ASHA standards (these may or may not be labelled 'teachers' certificates). Members of ASHA voted affirmatively on the new certification requirements which stipulate now that professional training must involve clinical work with children, and that such work must be supervised. Whereas convention programs used to provide only one session devoted to problems of therapy, now they provide many such sessions. On the Executive Council one finds represented individuals in public school programs, professional training in colleges, and research in speech science; I recall a year ago that it was a research man in speech science who had sufficient respect for the viewpoint of a speech therapist to second that person's motion for the requirement of more supervised clinical practice for advanced certification.

Seeking to Understand Another's Point of View

As those of us in therapy have needed to develop more psychotherapeutic skills we have become increasingly aware of the vast importance of *understanding* another's point of view rather than merely evaluating it. We have been discovering that behavior which we once would have evaluated as 'stupid,' 'blind,' 'warped,' or 'hopelessly maladjusted' is for the client in *his* frame of reference logically and emotionally consistent. As we become able to enter into his frame of reference to 'feel with him' and to communicate this understanding to him so that he feels he is being understood rather than judged, he becomes better

able to modify an extreme position and accept views from outside his previous frame of reference.

So, too, in this issue about which we feel so deeply, it seems essential that we make an earnest and continued effort to understand our various differing points of view and communicate such understanding to each other. This effort to understand must involve not only the logical reasons stated in support of points of view, it must include also the underlying assumptions and the feelings of the individuals concerned. The effort to understand must take into account a time-unit not just of immediate present but of a number of years, must take into account a space-unit not just of one individual or one designated group but of the larger professional group and indeed the whole culture in which we live.

I am going to try to state the case for each of two extreme positions taken by our membership on the matter of state certification. These will be labelled as belonging to 'public school personnel' and 'college and university personnel,' although it is recognized that such labels approximate only roughly the division of opinion which exists. Then the position of a third group, 'state department personnel,' will be mentioned briefly. Although they are outside of our Association they constitute a group with whom we will need to communicate in respect to this problem. I am going to try to describe both logical and psychological aspects as I myself have experienced them and as I have understood their existence in other persons.

Public school personnel. Those of us who have been associated with public schools have observed again and again what harm is done by speech and hearing therapists who go into public school jobs without special preparation for that type of job: harm in respect to children, school program, relations with colleagues.

In respect to children, for instance, such therapists have often had problems of 'discipline,' yet have not had understanding or skills to cope with those problems. Thus they have either sought help from teachers and principals on matters they should ordinarily have been able to handle unaided, or they have struggled alone, with the result that teachers and principals have had the choice of stepping in without being asked or of watching critically on the sidelines. Some therapists, finding that their 'book learning' about etiology and methods of therapy has left them without tools for the actual job of therapy, have gratefully borrowed methods and materials they saw classroom teachers using; others, feeling too threatened to seek help, have retreated into diagnostic work only.

In respect to school programs, for instance, such therapists have been lost when faced with the intricate problems of scheduling. They have not been acquainted with certain public school procedures together with reasons for such procedures, nor with certain values held by teachers and administrators. As a result they could not understand the points of view of their colleagues and so they could not collaborate with them in meaningful ways.

So, in respect to relations with colleagues, the consequences have been too often a decrease in mutual respect, an increase in tension in all persons concerned, disillusionment on the part of therapists about jobs in public schools, and disillusionment on the part of teachers and administrators

about the field of speech and hearing therapy. These events we have observed in greater-lesser degree, fortunately in sufficiently lesser degree that they have not prevented the growth of therapy programs in public schools nor prevented us as a professional group from gradually improving our interrelationships within ASHA.

But we need to probe deeper to understand the strength of feelings on the part of those of us who have had a special interest in therapy in public schools. These feelings are strong today, even though there is much factual evidence that actual conditions in the present are much less serious than in the past when, for example, there was no real ASHA requirement for supervised clinical practice as a part of professional training. It seems apparent that the explanation lies both outside and inside our Association.

The belief in professional training in Education for persons engaged in speech therapy in public schools is a part of a larger issue which has been and still is a potent source of conflict between persons in 'liberal arts' and 'education.' An so with such division lines already drawn, it is understandable that many of our membership in public schools have allied themselves with the larger group on this issue. Also feelings of division have existed widely between teachers in public schools and teachers in colleges, because of the assumed 'greater prestige' of college teaching, and because of the old differential in salary in favor of college teaching (almost reversed at present, however). This situation appears to have been perpetuated by both groups, even though unwittingly.

These feelings of division have existed also in our Association. Although it is probable that they exist mostly as a part of the larger cultural pattern, yet certain practices have intensified these feelings. Until recently most of the officers of the Association were drawn from those members employed in colleges and universities. So, too, were most of the Fellows, as well as most of the committee memberships. Until recently, also, few of the convention section meetings were devoted to therapy and the attendance at those consisted almost entirely of the members engaged in therapy.

Feelings have been intensified also by a perceived lack of respect by those in speech pathology and voice science for the research interests of those interested in therapy. Because the burning questions in therapy have concerned not voice science but broad aspects of human behavior, those members in therapy are not necessarily less imbued with a scientific spirit of 'wanting to know.' Because they are concerned with problems which cannot be studied yet with techniques of rigorous experiment and control those members are not necessarily less scholarly and scientific.

Regardless of some quite valid reasons in the past for the above mentioned practices it is understandable that such practices could symbolize assumptions about inferior status of members engaged in public school rather than college positions.

Strength of feeling on the part of public school personnel has been heightened also by the knowledge that professional training programs have been so weak over such a long period of time, in terms of actual skills required on the job. For too

long professional training consisted largely of courses dealing with etiology of speech and hearing disorders. Courses called 'methods of therapy' provided few laboratory experiences for students. What laboratory experiences there were consisted mostly of therapy with adult clients; when clinical practice with children was available, it was largely unsupervised. When the word 'supervision' was used it represented too often only a paper requirement.

Where provision has been made for staff to supervise clinical practice, far less attention has been paid to qualifications of the persons performing that function than to qualifications of persons doing diagnostic and research work. Feelings sometimes became the stronger when it appeared that people in colleges were indifferent to the needs of those in public schools, despite the fact that the very expansion of public school programs had the direct effect of increasing the importance and scope of the college programs of professional training and research.

I have tried to speak as honestly as I know about the position of our membership in public schools. Because this represents a summary or composite of opinions and feelings it should not be inferred that every individual holds every opinion or has every feeling described here. It is my hope, however, that I have covered a range of possibilities in regard to existing opinions and feelings. Next I am going to try to speak as honestly as I know, and with similar intent, about the position of our membership in colleges and universities.

College and university personnel. I think it may be assumed in this day and age that few if any members of ASHA are criticizing the teacher's-certificate requirements because of lack of interest in programs of speech and hearing therapy in public schools. We know that public school programs of therapy are responsible for many jobs in our field. Those of us in professional training and research value these programs because many of us had a share in creating them and all of us have a share in maintaining and increasing them.

It may be assumed further that those of us in professional training are eager to perform our functions well. What we want is to so train students that they will render significant service to their clients, give satisfaction to employers, and bring credit to the whole profession. Some of these jobs are in public schools, others in colleges and universities, in hospitals (VA and children's), in medical and dental centers, Crippled Children Society programs, Junior League schools, a few in private practice. We have become increasingly interested in the past few years in determining the specific problems encountered in clinical work generally, public school programs included.

We conceive it to be our function in professional training to be concerned not only with meeting present needs in regard to therapy but also with investigating problems whose solution will make possible better therapy in the future. To this end we believe it is important to combine research with our functions in professional training: experimental practice in therapy, experimental work in speech and hearing science, investigation of the body of knowledge of other allied fields in the social sciences (psychology, psychiatry, education, anthropology, etc.) as well as in the biological and physical sciences, medicine and dentistry. Out of this re-

search will come modifications and enrichment of professional training.

One of the most potent results of such research over the last few years has been our increased awareness of the complexity of the process called speech, and also increased awareness of the complexity of the process called therapy. We came to see first that drill on speech mechanics for persons who stutter did not have lasting benefits, nor did the old concepts of mental hygiene, such as pep talks about gaining confidence or overcoming fears. We saw again and again that a child's learning to produce consonant sounds in speech classes was not equivalent to his using those sounds in speech outside the classes; that many speech disorders were associated with emotional conflicts and hence required different modes of treatment; that psychiatrists and clinical psychologists were not available in sufficiently adequate geographical distribution nor in large enough numbers to relieve us from grappling with those problems ourselves. We saw that work with parents should constitute an important part of speech therapy with children but that it involved much more than just setting aside time for a conference and 'telling them' what was wrong and what they should do.

The process of speech therapy as we are conceiving it today involves many skills, psychotherapeutic as well as mechanical and educational. These skills require of the therapist not only technical mastery and scientific knowledge but also some better understanding of his own personality organization and behavior. We believe that standards for professional training should be determined by the nature of the work to be done in therapy and the qualifications therapists must have in order to do that work well.

Thus we are striving to improve existing courses and to increase the number of courses from the few that were established when the field was in its infancy. We are striving also to include in professional training a number of courses in closely allied fields such as clinical psychology and c u l t u r a l anthropology. Inevitably, therefore, we have been forced to scrutinize the relevance of other course requirements, among them those in Education for a teacher's certificate.

Dr. Brown spoke for this point of view in his article.

> Consider the unhappy director of a training program for speech or hearing clinicians. In order to be graduated, his students must take certain courses specified by the university in question. They must sit through and pass a number of courses in Education. Somewhere there must be fitted into their programs a group of courses in Speech Pathology. . . . It is not easy to explain to a student why because he wants to be a speech clinician, he must register for Methods of Teaching in the Elementary School, or Children's Literature, or Principles of Geography. No criticism is intended of these or any other Education courses. Neither is it argued that Education courses contribute nothing to training of a speech clinician. The point is that few if any directors of Speech Pathology training programs would have chosen to require of their students a great many of the Education courses now specified by various states. . . . Speech and hearing clinicians are often required to have detailed training for work they are never expected to do.

In the days when our field was relatively undeveloped and the number of full time jobs in speech therapy were few, we felt that such education requirements were relevant for the economic protection of students. Also we recognized at that time that they offered knowledge and skills in handling children which our field was in no way prepared to offer generally. Today, however, conditions are different. There are more speech therapy

jobs than therapists. We are more and more offering in our own clinical practice knowledge and skills in handling children which we feel are equal to and often superior to those in Education. It seems appropriate, therefore, that we question old requirements in the light of present day conditions.

Those of us in professional training must view this issue from the position of training students who go into various types of jobs, of which public schools constitute only one type. We are viewing the perpetuation of traditional requirements in education (1) as preventing adequate professional training for therapists going into public schools; (2) as imposing some undesirable requirements upon other types of therapy jobs. Public school jobs are probably greater in number than any other one type at the present time. Since students in process of training do not yet know what sort of job will be available or desirable when they have finished, it is virtually necessary that they prepare to meet requirements for all the existing types of jobs. Such a situation appears distasteful both to them and their instructors when some of those requirements seem extraneous to the professional task involved.

We do not believe that public school systems as *systems*, any more than hospitals or Crippled Children's Societies as systems, should be the determining factor in constituting the process of speech therapy or qualifications of persons engaging in it. That process should be determined by the needs of the child with the disordered speech together with known knowledge and skills about therapy with him. A child with cleft palate, for example, takes his lack of palatal function, his hearing loss, need for medical and dental care, his emotional conflicts, speech symptoms, etc. into whatever building he goes for speech therapy, whether it be to college, hospital, private or public school clinic. His needs and the procedures by which those needs can be met are the same regardless of the type of building or institution offering a speech therapy program.

We are troubled by the currently frequent use of the term 'public school speech therapy,' as if somehow the process of therapy and hence the qualifications of speech therapists should be different in public schools. Our concern is not merely distrust of a term; it involves rigidity in a system. For example, experienced therapists have gone into certain public school jobs—some of them therapists who have had a background of classroom teaching experience. They have not been permitted to do the thing which currently represented the best known in our field and allied fields. They have been told that they must meet a certain case load because of state requirements and because parents and teachers expect it. They could not offer therapy for parents because the nurse, or the psychologist had been designated to hold all conferences with parents, because there wasn't time, because the parents would feel threatened, etc. They were required to have a fixed and undeviating schedule at various schools so that classroom teachers would not feel envious or mistrust them, despite frequent critical needs that arose on the spot in regard to conferring with doctors, social workers, parents, or with the child himself. Their suggestions for modifying certain traditional practices were met with the response, 'That just wouldn't work in a public school system'; and when they ex-

plained that such modifications had been tried and found satisfactory in some public school systems, the response followed, 'But it wouldn't work in *this* school system.'

In professional training we come in contact with many students who do not want to work in public school programs; we know of many who after spending a couple of years in public schools, begin to look toward other types of therapy jobs. Those of us who have known public schools and believe in them recognize that public school programs have particular assets which make them potentially exciting for clinical work. The chief liability at present appears to consist of this: 'a system' squeezing into a mold of the past, a program which is bursting with possibilities of the present and future.

State department personnel. This certification issue admittedly is one that must first be faced and worked through within ASHA; but when we know better what we want, it must then be worked through with state department personnel. Thus it seems important that we have some warmth of understanding for their position so that we do not project on them feelings of frustration and responsibility which belong in us.

When we deplore the rigidity of certification practices in certain states as they block some of our vital interests, let us understand that certification officials, like ourselves, are a product of this 'scientific age.' They too live in a society employing large scale production: each applicant for certification cannot be known and evaluated individually as to qualifications; operational definitions are desired procedures even though it is known that such definitions often do not represent actual human skills. Let us not assume as fact, until we have explored the situation quite thoroughly with them, that state officials approve entirely of certain traditional practices. It is possible that they have merely accommodated themselves to those practices, as indeed we have felt obliged to accommodate ourselves to certain college requirements which could not be changed overnight.

Most of us who have had direct contact with members of this professional group feel warmly toward them as people, have felt that they very much wanted to inform themselves about our field. If, as they have sought to understand, they have put that information in terms of their own field, sometimes changing our meaning, we can recognize that, too, as a human characteristic in which we ourselves engage. It means we need to provide more continuous communication with them in order to share meanings more definitively.

These people in Education, again like ourselves, often continue to operate on traditional assumptions long after they have rejected the assumptions verbally. Those of us who follow the literature in the field of Education are impressed with changes that are occurring in educational practice. They, too, are reaching out increasingly for what various special fields can offer – in medicine, dentistry, nutrition, sociology, clinical psychology, and psychiatry, speech and hearing. They are breaking out of rigidities of the past; in using those specialities, in modifying the character of classroom education so that schools are becoming more *child-centered* than curriculum centered.

When we do ask state department personnel to meet with us we may well find that they will join with us, in a way that is epitomized in a new ver-

sion of an old maxim: 'Seek and ye may find something better than that which ye have been seeking.'

Clarifying Basic Issues

Finally, in seeking to create a psychological climate for communication about this problem of certification it seems essential that we should probe to clarify basic issues. In considering this task we may well explore the application of a concept being stressed now in philosophy of science. This concerns *asking questions.* Langer, in her book, *Philosophy in a New Key*, stresses the methodological importance of questions: 'The "technique" or treatment of a problem begins with its first expression as a question.' She emphasizes the importance of the *kind* of questions asked. 'By misplacing our questions, we jeopardize our answers.' In speaking of a man who contributed richly to the development of philosophy she emphasized the consequences of asking *new* kinds of questions: 'He had not new answers but new questions and t h e r e w i t h he brought forth a new conceptual framework, an entirely different perspective.' Rappoport affirms such a point of view: 'We will measure the value of an orientation not by the number of answered questions it contains but by the abundance, variety and meaningfulness of the unanswered questions it gives rise to.' In stressing the importance of the kinds of questions he said, 'A young physicist named Einstein, instead of trying to fit the answers into *existing* notions of time and space, *attacked the notions* themselves.' (italics mine)

Those of us engaged in therapy have been discovering that such a point of view applies not only to research but also to counseling and to human relations generally. Clients do not need answers in response to their questions. They need to learn how to ask the right kind of questions, to see the situation sharply. Then they become able to get their own answers, to perceive the possibility of solutions which previously had been rejected or nonexistent as possibilities, to choose the solution most appropriate for them.

So in this situation we need to explore new kinds of questions: questions which will lead us to probe deeper than the more obvious symptoms, questions which will lead us to scrutinize existing notions and the assumptions underlying them.

Let us start by questioning the assumption long held and frequently expressed that speech therapists should have courses and/or experience in classroom teaching. We can discard the onetime reason of economic protection since there are now more job opportunities than trained therapists. This leaves the reason that such training is necessary in order to do a satisfactory job of speech therapy. But here one becomes aware of a paradox. The recognition of the need for speech therapy in public schools carries the tacit admission that classroom teachers do not have knowledge and skills to do speech therapy (it cannot be simply a matter of their not having time because speech therapists are urged to carry on a program of education in speech therapy with classroom teachers). Yet at the same time it is assumed that students in speech therapy will not acquire sufficient knowledge and skills to do speech therapy unless they take the kind of training that those classroom teachers have had. Such confusion makes evident the need for further exploration.

Brown felt this confusion 'arises from the misdefinition of speech and

hearing clinicians as "teachers".' It seems to me the issue goes even deeper than one of verbal definition: that clinicians could be called teachers or not, as one chose, if *their role* were not confused with that of classroom teachers, i.e., if their activities were not considered equivalent to academic instruction with the responsibility for teaching subject matter such as reading, arithmetic, social studies, etc. Brown went on to state, 'These children are often collectively referred to as exceptional children, and the activities of the schools in meeting the problems they present are termed special education.' Much of 'special education' is concerned with the academic teaching in special classes of children who cannot get along by remaining in regular classrooms. If speech therapists were responsible for the academic teaching of children with speech disorders then it would certainly seem appropriate for them to take full work for a (classroom) teachers' certificate. They are not responsible for such academic teaching, however, as is clearly recognized by all.

It would seem that our own field is as responsible for this confusion between the processes of therapy and classroom teaching as are public school personnel, perhaps even more so. We must recognize that until comparatively recently therapy as an area of study was largely ignored in professional training. It was left to the ingenuity of therapists when they arrived at their jobs. Then in their desperation they copied classroom methods of teaching. Such methods applied in our field gradually began to appear in our textbooks and became the accepted techniques of speech therapy. When these techniques are examined, it appears that many of them are based on assumptions (1) that speech is similar to other academic subjects and should so be taught; (2) that when a child has a speech disorder he will get over it if he is 'taught how to talk'; and (3) that the prescription should be drill on the mechanics of the process. Here one can discern the more hidden assumption that repetition per se constitutes the important variable in changing behavior.

Various newer textbooks and articles, however, are presenting more modern, apparently more valid assumptions. They define problems of speech therapy in terms of removing barriers of various sorts which prevent children from developing the characteristically human behavior called speech. Thus, as fast as we are able to implement these newer conceptions of therapy we are moving away from traditional classroom methods and subject matter, which have not been sufficient in themselves to help a child eliminate his speech problem. In many cases his classroom experience with them has meant that they already symbolize failure in his mind and for that reason alone they constitute undesirable materials for speech therapy. Furthermore, it has been observed again and again that when a child's particular barriers to development of speech have been lessened or removed, he becomes able to engage in classroom activities without having had special help on the subject matter itself. Thus one must question seriously the assumption that the speech therapist should be required to take courses dealing with methods of classroom teaching on the grounds that he will need to use that subject matter and those techniques in *his* relationships with the child.

The other reason given for such a

requirement is that the speech therapist will then be able to 'get along with' and win the cooperation of classroom teachers. As far as I know, I have worked productively and pleasantly with classroom teachers for years, as many of the rest of our membership have. It is difficult to believe that such collaboration has depended upon 'our being like them' in knowledge and skills. It seems more probable that it has depended rather upon our having knowledge and skills *different* from theirs and using these to serve them in helping to solve problems. I recall through the years many instances of teachers and principals taking pains to help young staff members whom they liked and respected. It even seems possible that much of the early dissatisfaction with speech therapists in public schools existed not so much because the therapists did not know about public schools as because they did not know their own job of speech therapy.

The subject of professional relations with classroom teachers has unquestioned importance both on the job and as part of professional training. What *is* being questioned is the assumption that satisfactory relationships with teachers demand certification in their speciality. It would seem more reasonable to assume that the basic principles governing satisfactory human relations apply generally, to public school personnel as well as to the other specialists with whom speech therapists must deal, in or out of public school programs. When one begins to list these other specialists—in medicine: plastic surgeons, orthopedists, neurologists, otolaryngologists, psychiatrists; in dentistry: orthodontists and prosthedontists; c l i n i c a l psychologists, social workers, physical therapists, nurses, etc.—it is significant, and indeed fortunate, to point out that in no case is it required that certification in the particular specialty be met by speech therapists in order to discharge professional activities satisfactorily.

It would seem pertinent for us to ask a question of this sort: How best can we provide in professional training—both in course work and laboratory experience—the now available knowledge and skills which will enable students to develop productive professional relations with all of the persons with whom they will come in contact?

In respect to the issuing of certificates by State Departments of Education for work in public schools, the issue involves not whether such certification is desirable nor even whether it bears the name 'teacher's certificate' in speech and hearing therapy; it does involve what requirements are specified and by what academic administrative unit the work may be taken. It also involves the degree of responsibility and leadership which ASHA needs to assume in regard to state requirements. There seems little question but that a speech therapist who is to join the staff of a public school should have an understanding of the structure, purposes, assets, liabilities, values and process of public school education. By 'understanding' is meant knowledge combined with some actual supervised experience in speech therapy in a public school.

There seems room for considerable questioning, however, about the relative adequacy of existing courses: whether they can more profitably be given by a speech therapist than by an instructor in general Education; how much flexibility should exist in honoring credit in Colleges of Education and/or Colleges of Arts and Sciences; the extent to which ASHA re-

quirements should be made more specific in requiring knowledge about organizing and administering speech therapy programs in public schools; and perhaps especially the extent to which ASHA requirements should be made more specific in requiring more knowledge and skills in understanding and handling children.

Finally, in addition to questioning old assumptions, we need to raise questions about procedures for dealing with this problem. What plans can we make for discussion and study so that (1) we can see the problem from the point of view of the profession as a whole, rather than merely as it exists in our own locality, and so that (2) we can find solutions which the whole Association can unite on and support? How can we plan for better long range communication with our membership so that on the one hand professional training can become more responsive to the needs of the profession as seen by therapists in the field, and so that on the other hand programs of therapy can become more responsive in applying new research developments? How can we plan for better communication with State Department Officials so that they can understand this developing field as it is in any given present, and so that they can help us by their requirements to provide better programs of therapy? As we discover what modifications seem right to make at any given time, we need to ask also: How may these changes threaten members and programs in various parts of the country, and how may these persons and programs be safeguarded by action of our Association without preventing such needed changes?

Ollie Backus
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Book Reviews

HAHN, ELISE, LOMAS, CHARLES W., HARGIS, DONALD E. AND VANDRAEGEN, DANIEL. *Basic Voice Training for Speech.* New York: McGraw-Hill Book Co., 1952. Pp. 253. $4.00.

This college text in voice training for speech has merits which distinguish it from some other such books. First, the authors have been able to produce an 'atmosphere of sound' through an emphasis on critical listening to the various aspects of vocal production, both in recordings and in classroom and outside situations. It appears that the student will recognize that he is not just reading about voice, but will feel stimulated to put into practice many of the suggestions given for improvement. Second, the personalized approach implicit in the comments above, the conversational 'you,' actually makes the reader start the analysis of his own vocal problems. Third, as the authors have stated, they have so arranged their material that the practice exercises follow closely upon the theoretical discussions, diagrams, and explanations. Throughout the book there is the point of view that voice and articulation will be determined by the number of factors such as physical structure, environment, personality factors, as well as the present situation.

Suggestions for voice recordings and selections for practice are included in the two appendices.

This reviewer feels that since the primary emphasis throughout the book is upon the importance of listening, the authors should have recommended a preliminary hearing test for the students.

In addition to the many other values this book possesses, the student will find helpful material on articulation standards and phonetics.

KATHERINE F. THORN.
University of Buffalo

VAN DUSEN, CLARENCE R. *Training the Voice for Speech: A Guide to Voice and Articulation Improvement.* (2nd ed.) New York: McGraw-Hill Book Co., 1953. Pp. 286. $4.00.

This book, offered for the voice and articulation course, attempts to focus both the findings of voice science and the precepts of teaching experience on the problem of developing effective voice and articulation. To a considerable degree, this attempt is successful. True, the inevitable compromises, as in the treatment of breathing for speech, seem predominantly in the direction of practical precept. But this is probably appropriate.

Treated in the following sequence are such topics as the basic elements of sound; ear training; mechanics of vocalization; relaxation, posture, and breathing for vocalization; improving pitch, loudness, quality, and flexibility; articulation and pronunciation; rate and rhythm; and suggestions to teachers. The basic approach is one of study followed by practice. Effective speech is taught as a skilled act. Token tribute is paid to the need for personality improvement. But essentially this is a book for the student who is already well enough adjusted to want to improve his speaking voice.

The scope and variety of exercises is excellent. The book is practical, authentic, interestingly written. Van Dusen is to be congratulated on this improvement of his earlier text.

JOHN V. IRWIN.
University of Wisconsin

BICE, HARRY V. *Group Counseling with Mothers of the Cerebral Palsied.* Chicago: The National Society for Crippled Children and Adults, Inc., 1952. Pp. 42. $.50.

Parents of children with cerebral palsy have many problems common to *all* parents and many problems unique to them. The author, on the basis of eight series of counseling sessions with mothers, presents excerpts from their group discussions which delineate the difficulties they encountered in rearing children with cerebral palsy. Three areas are explored briefly: Attitudes of the parents; growth, development, and education of the children; attitudes of other

Book Reviews is edited by Kenneth Scott Wood, University of Oregon.

people such as the specialist, the neighbor, the teacher.

Attention is called to the benefits derived from a counseling project of this nature where common experiences are shared, and where clarification of problems is sought rather than solutions.

In the reviewer's opinion the direction of the work described is extremely important. It makes a valuable contribution in specifying complexities and perplexities associated with treatment of these children. While the pamphlet lacks organization and may be somewhat confusing in its omission of evaluation or suggestions for guidance, it may result in greater efforts being made in this important area of parent education.

JANE BEASLEY.
University of Alabama

FROESCHELS, EMIL. *Dysarthric Speech*. Magnolia, Mass.: Expression Co., 1953. Pp. 172. $3.75.

Froeschels approaches 'dysarthria' as a generalized term for disorders of speech caused by injuries to the central nervous system, particularly the brain.

Aphasic and apractic patients, he states, lack the guiding ideas of speech in action; the clinician's task is to provide them with these ideas.

The author feels that his chewing method helps speech in cerebral palsy partly because chewing is less emotionally burdened than speaking. He believes that 'the first aim in the treatment of dysarthric speech should be the harmonizing and bringing into the greatest possible balance those muscles which participate in the formation of voice and speech.'

The author emphasizes the importance of careful objective analysis of these cases and presents from his clinical experience many techniques for dealing with these problems. Our profession has need of a great deal of material of this sort and this book constitutes an important step in the direction of presenting academic and practical material in the field of the neurological disorders which handicap communication.

MARTIN F. PALMER
Institute of Logopedics

LEVINSON, ABRAHAM. *The Mentally Retarded Child*. New York: The John Day Co., 1952. Pp. 190. $2.75.

This remarkably well-written little book comes as a welcome addition to the rapidly growing collection of literature for parents of handicapped children. In language appropriate for the layman, the author, obviously an authority in the field of the mentally retarded, has condensed a wealth of valuable information into this small book. It should become not only a boon to parents of the mentally retarded, but also a simplified yet fairly comprehensive introduction for students specializing in this and related fields. Numerous allusions to the need for careful diagnosis and treatment of speech problems reflects the author's appreciation for this phase of the rehabilitation program. Of particular value to both parents and educators is the geographical list of public and private institutions for mentally retarded children in the United States.

MARY HUBER.
Los Angeles State College

JOHNSON, WENDELL, DARLEY, FREDERIC L. AND SPRIESTERSBACH, D. C. *Diagnostic Manual in Speech Correction: A Professional Training Workbook*. New York: Harper and Brothers, 1952. Pp. 221. $2.50.

This manual has been described by its authors as a handbook for practicing speech correctionists, physicians, clinical psychologists, special education supervisors, instructors, and students in training. Essentially designed for use as a workbook to accompany class lectures and texts, its format allows for page removal, each page being marginally perforated and punched for ring-binder notebook use.

The book contains 22 units arranged somewhat in a temporally sequential order. Beginning with a discussion of *The Case History* as Unit 1, it progresses to the examination itself (20 units) and concludes with *The Examination Report* (Unit 22). Of these, seven are devoted to diagnostic procedures in stuttering. A unit on *Handedness* is inserted after the section on *Stuttering*. Each unit section is accompanied by one or more diagnostic forms suggested for clinical use or student practice assignments. Six forms accompany the units on stuttering and 'nonfluency.'

Following the 171 pages of actual examination materials, a 10-unit appendix supplements the foregoing with an excellent section on *The Professional Point of View*, 13 professional vocabulary lists for student assignment purposes ranging in scope from *Phonetics* (List No. 1) to *Stuttering and Semantics* (List No. 13). The appendix also

includes *Rating Sheets for Student Clinicians,* and checklists or recording forms for *Observation of Nonfluencies in Normal Speakers, Simulating Stuttering, Evaluation of Hearing Acuity, Making Observations of Adjustment and Reactions to Therapy, Preparation of Articulation Drill Material, Remedial Case Summaries,* and *Daily Logs.* An alphabetically arranged reference list of 71 sources concludes the manual.

A workbook of this type has been long awaited in the field of speech correction. This redoubtable Iowa triumvirate has published many usable materials. Although conspicuously loaded with the Johnsonian theory of 'semantogenics' and 'diagnosogenics' of the stuttering symptom, oddly enough very little was written about the diagnosis of the prereading child stutterer. This reviewer feels that, while not always agreeing with the rationale for the inclusion of certain specific test items, the omission of units *per se* on cleft palate, cerebral palsy, aphasia, etc., significantly points toward the function of the diagnostic procedure as one which should not label the client before the examination. This manual can serve as a model for other test constructors and as an adjunctive text for courses in clinical techniques.

VICTOR P. GARWOOD.
University of Southern California

JANSSEN, GUTHRIE E. *A Salesman's Handbook Course in Human Engineering.* Lakeville, Conn.: Guthrie E. Janssen, 1950. Pp. 48. $1.75.

JANSSEN, GUTHRIE E. *Basic Human Engineering Handbook.* Lakeville, Conn.: Guthrie E. Janssen, 1950. Pp. 65. $2.00.

The author defines 'human engineering' in terms originally formulated by Alfred Korzybski in his book, *Manhood of Humanity:* '. . . Human Engineering . . . is . . . the science and art of so directing human energies and capacities as to make them contribute most effectively to the advancement of human welfare.' The author takes into account the potentialities of humans; he aims at explaining the realities of human relationships; and his central thesis is that deliberate 'communication-action' by people toward devising the most economical (in the sense of the most efficient) patterns of human relationships will reduce over-all human work in the long run, while increasing production and distribution of benefits.

The author believes that a 'joint economy,' defined as 'a functioning set of factors so arranged and managed that all parties may conveniently contribute to it and conveniently draw from it,' is the most efficient human relationship. He illustrates schematically several common human relationships such as marriage, selling, clubs, etc., and discusses in detail the need for viewing them as 'joint economies' if they are to be understood and made to function efficiently.

He says that the proper functioning of a 'joint economy' depends on recognition of 'strategic factors' (those that are limiting it from having the desired outcome) and taking deliberate action so that the desired outcome will result with the least total work. Some common strategic factors which he identifies and analyzes are: Lack of communication, failure to regard language as a public facility, failure to gauge and control relationships before they get out of control, and the need for a 'system' (government, organization, etc.) which permits humans a maximum exercise of their unique capacity to communicate through many generations, and among themselves in present time, so as to contribute to the understandings, laws, theories, institutions, agreements, etc. by which they regulate their lives and the world they live in.

The author states that preachments improve neither bridges nor human relationships, for with both the central problem is *how.* These manuals are 'intended simply to explain, within limits, how the realities of human relationships work.' They have succeeded in presenting in understandable language a point of view which deserves serious consideration.

MARION F. FREEL.
State University of Iowa

WALKER, JANE. *Jane Walker's Book of Art Lectures for Lipreading Practice.* (Mimeographed) Washington, D. C.: The Volta Bureau, 1951. Pp. 61. $3.12.

In order for the hard of hearing person to attain maximum proficiency in lip reading, he must spend many hours in varied kinds of practice. Knowing this, it behooves the teacher to find interesting materials around which to build his lessons. Miss Walker's book is a source from which lip reading lessons about art might be taken. In the hands of a skilled teacher many interesting lessons might be built from its

pages. Such a book is a time-saver. Other than that, it makes little contribution to the field.

JACQUELINE KEASTER.
State University of Iowa

SAFIER, DANIEL E. *The Listening Book.* Caldwell, Idaho: The Caxton Printers, 1952. Pp. 158. $4.00.

This is a book to read aloud to children of preschool and primary age levels. The material encourages the child to take part in the reading play and invites active listening. Much of the material is about sounds, and extensive use is made of onomatopoetic words. The following are examples of chapter headings: *The Sound That Turned Around, The Sound That Kept On, The Edible Alphabet,* and *The Story of Slow Joe.*

FOERSTER, HEINZ VON AND OTHERS, eds. *Cybernetics: Circular Causal and Feedback Mechanisms in Biological and Social Systems.* New York: Josiah Macy, Jr. Foundation, 1952. Pp. 260. $4.00.

This is a record of the Transactions of the Eighth Conference held in New York, March 15-16, 1951. As the editors indicate, it is a partial account of conversations within a group whose interchange extended beyond the confines of a two-day meeting. This account does present to the reader a fragment of the interchange representing a concerted effort at interdisciplinary communication.

Participants came from many different fields; they were physicists, mathematicians, psychologists, electrical engineers, psychiatrists, neurologists, sociologists, and anthropologists. According to the editors of the book, they all seemed to share the belief that 'one can and must attempt communication across boundaries, and often chasms, which separate the various sciences.'

This volume is the third in a series dealing with circular causal and feedback mechanisms. Transactions of the Sixth and Seventh Conferences on Cybernetics are the only preceding ones which are available in print.

The discussions at the Eighth Conference centered around the following topics: (1) Communication Patterns in Problem-solving Groups, (2) Communication Between Men: Meaning of Language, (3) Communication Between Sane and Insane: Hypnosis, (4) Communication Between Animals, (5) Presentation of a Maze-solving Machine, (6) Search for Basic Symbols, (7) Nomenclature of Information Theory.

HINCKLEY, ROBERT G. AND HERMANN, LYDIA. *Group Treatment in Psychotherapy: A Report of Experience.* Minneapolis: University of Minnesota Press, 1951. Pp. 146. $3.00.

This analysis of the group therapeutic process is based upon the authors' experiences with group therapy in the Student's Mental Hygiene Clinic of the University of Minnesota during the last 10 years. The book discusses the functions of the group and of the therapist, the role of the patient, the dynamics of group movement, and the functional mechanics in the group. Verbatim accounts of group work are cited for purposes of illustration.

ANDERSON, HAROLD H. AND ANDERSON, GLADYS L., eds. *An Introduction to Projective Techniques: And Other Devices for Understanding the Dynamics of Human Behavior.* (Text ed.) New York: Prentice-Hall, Inc., 1951. Pp. 720. $6.75.

Twenty-eight contributors deal with the theory and the problems of most of the known projective tests and techniques. Some attention is also given to the use of certain intelligence tests in personality appraisal. The foreword was written by Henry A. Murray, and the contributors represent, in the main, the most authoritative that could be found in this field. A selected bibliography accompanies each of the 24 chapters.

VINACKE, W. EDGAR. *The Psychology of Thinking.* New York: McGraw-Hill Book Co., 1952. Pp. 392. $5.50.

This is an experimental and systematic study of the psychology of human thinking. The author treats the historical and theoretical background, reasoning, imagination, and general aspects of personalized thinking. The book contains considerable detail on the results of research pertaining to the mechanism of thinking and attempts to clarify the kinds of problems which confront the investigator of human thinking. The interplay of factors in thinking is a recurrent theme. An extensive bibliography is given for each of 16 chapters.

Liberal reference is made throughout the book to various aspects of language, verbalization, logic, and speech; and special

attention is given in one chapter to Watson's central-peripheral theory of thinking with experimental evidence cited for and against.

PIAGET, JEAN. *The Origins of Intelligence in Children.* New York: International Universities Press, 1952. Pp. 419. $6.00.

Translated from the French by Margaret Cook, this work contains original observations on young children and detailed descriptions of experiments. Piaget divides the growth of intelligence into six sequential stages: The use of reflexes; first acquired adaptations and primary circular reaction; secondary circular reactions and the child's procedures for prolonging events interesting to him; the coordination of secondary schemata and their application to new situations; tertiary circular reaction and the discovery of new means through active experimentation; and the invention of new means by mental combination.

ANDERSON, IRVING H. AND DEARBORN, WALTER F. *The Psychology of Teaching Reading.* New York: The Ronald Press, 1952. Pp. 382. $4.75.

The principal purpose of this book is to review the psychological evidence underlying the techniques of teaching children to read. The main topics are: Reading as growth; the concept of reading readiness; the psychology of learning to read; the psychology of word perception; the psychology of methods of teaching reading; teaching reading by a combination of methods; and the evaluation and measurement of achievement in reading. A bibliography of 368 entries is included.

DEESE, JAMES. *The Psychology of Learning.* New York: McGraw-Hill Book Co., 1952. Pp. 398. $5.00.

This text is designed for students who have already had an introductory course in psychology. It emphasizes experimental evidence. It is not a compendium of current theories of learning, but a survey of problems in the psychology of learning from experimental literature of the past 10 years. An extensive bibliography of approximately 600 entries is given.

Current Publications

ABRAMSON, HAROLD A., ED. *Problems of Consciousness: Transactions of the Third Conference, March, 1952.* New York: Josiah Macy, Jr. Foundation, 1952. Pp. 156. $3.25.

AMERICAN PHILOSOPHICAL ASSOCIATION, EASTERN DIVISION. *Science, Language and Human Rights: Symposia Papers.* Philadelphia: University of Pennsylvania Press, 1952. Pp. 211. $2.50.

BELLAK, LEOPOLD. *Psychology of Physical Illness.* New York: Grune and Stratton, 1952. Pp. 243. $5.50.

BICE, HARRY V. *Group Counseling with Mothers of the Cerebral Palsied.* Chicago: The National Society for Crippled Children and Adults, Inc., 1952. Pp. 42. $.50.

BRUEL, PER V. *Sound Insulation and Room Acoustics.* New York: Anglobooks, 1952. Pp. 286. $4.90.

CALLEROS, A. *Thought and Electric Waves.* New York: Pageant Press, 1952, Pp. 34. $2.00.

DAVIDSON, AUDREY AND FAY, JUDITH. *Phantasy in Childhood.* New York: Philosophical Library, 1953. Pp. 188. $4.75.

DAVIS, JOHN E. *Clinical Applications of Recreational Therapy.* Springfield, Ill.: Charles C. Thomas, Pub., 1952. Pp. 136. $3.75.

ELLIOTT, ARTHUR AND DICKSON, JOHN H. *Laboratory Instruments: Their Design and Application.* New York: Anglobooks, 1952. Pp. 414. $4.50.

EYSENCK, HANS J. *The Scientific Study of Personality.* New York: Macmillan Co., 1952. Pp. 333. $4.50.

FEDERN, PAUL. *Ego Psychology and the Psychoses.* New York: Basic Books Pub. Co., 1953. Pp. 375. $6.00.

FEIGENBAUM, LAWRENCE H. *Effective Reading.* New York: Globe Book Co., 1953. Pp. 214. $2.00.

FLETCHER, HARVEY. *Speech and Hearing in Communication.* New York: D. Van Nostrand Co., 1953. Pp. 461. $9.75.

FROESCHELS, EMIL. *Dysarthric Speech.* Magnolia, Mass.: Expression Co., 1953. Pp. 172. $3.75.

GARRET, HENRY E. *Statistics in Psychology and Education.* (4th ed.) New York: Longmans, Green, and Co., 1953. Pp. 472. $5.00.

GUTHRIE, D. J., ED. *Turner's Diseases of the Ear, Nose and Throat.* (5th ed.) Baltimore: Williams and Wilkins Co., 1952. Pp. 246. $8.00.

HARROWER, MOLLY. *Appraising Personality: The Use of Psychological Tests in the*

Practice of Medicine. New York: W. W. Norton and Co., 1952. Pp. 214. $4.00.

HAVIGHURST, ROBERT J. *Human Development and Education*. New York: Longmans, Green, and Co., 1952. Pp. 347. $4.00.

HEILBRUNN, L. V. *An Outline of General Physiology*. (3rd ed.) Philadelphia: W. B. Saunders Co., 1952. Pp. 818. $10.50.

KECSKEMETI, PAUL. *Meaning, Communication, and Value*. Chicago: University of Chicago Press, 1952. Pp. 357. $8.50.

KLUCKHOHN, CLYDE AND OTHERS, EDS. *Personality in Nature, Society, and Culture*. (2nd ed.) New York: Alfred A. Knopf, Inc., 1953. Pp. 741. $5.75.

KRIEG, WENDELL J. S. *Functional Neuroanatomy*. (2nd ed.) New York: Blakiston Co., 1953. Pp. 677. $9.00.

LOEHRICH, ROLF R. *Oneirics and Psychosomatics: An Introductory Treatise Concerning a New Theory of Psychoanalysis, Its Logic and Methodology*. McHenry, Ill.: Compass Press, 1953. Pp. 171. $6.00.

LONG, ELINOR H. *The Challenge of the Cerebral Palsied Blind Child*. New York: American Foundation for the Blind, 1952. Pp. 36. $.30.

MANDL, MATTHEW. *Hearing Aids: Their Use, Care and Repair*. New York: Macmillan Co., 1953. Pp. 169. $3.50.

MOENCH, LOUIS G. *Office Psychiatry*. Chicago: Year Book Publishers, 1952. Pp. 310. $6.00.

MOUSTAKAS, CLARK E. *Children in Play Therapy: A Key to Understanding Normal and Disturbed Emotions*. New York: McGraw-Hill Book Co., 1953. Pp. 227. $4.50.

PIAGET, JEAN. *The Origins of Intelligence in Children*. (2nd ed.) New York: International Universities Press, 1952. Pp. 430. $6.00.

PUMPIAN-MINDLIN, E., ED. *Psychoanalysis as Science: The Hixon Lectures on the Scientific Status of Psychoanalysis*. Stanford, Cal.: Stanford University Press, 1952. Pp. 184. $4.25.

RASMUSSEN, ANDREW T. *The Principal Nervous Pathways: Neurological Charts and Schemas with Explanatory Notes*. (4th ed.) New York: Macmillan Co., 1952. Pp. 82. $4.50.

RAUBICHECK, LETITIA. *Your Voice and Speech*. (Rev. ed.) New York: Prentice-Hall, Inc., 1953. Pp. 376. $3.24.

REID, JOSEPH H. AND HOGAN, HELEN R. *Residential Treatment of Emotionally Disturbed Children: A Descriptive Study*. New York: Child Welfare League of America, 1952. Pp. 322. $3.50.

SARASON, SEYMOUR B. *Psychological Problems in Mental Deficiency*. (2nd ed.) New York: Harper and Brothers, 1953. Pp. 412. $5.00.

SICHER, HARRY. *Oral Anatomy*. (2nd ed.) St. Louis: C. V. Mosby Co., 1952. Pp. 532. $13.50.

SIMPSON, RAY H. *Improving Teaching-Learning Processes*. New York: Longmans, Green and Co., 1953. Pp. 469. $5.00.

SNYDER, F. W. AND PRONKO, NICHOLAS H. *Vision with Spatial Inversion*. Wichita, Kan.: University of Wichita Press, 1952. Pp. 144. $2.00.

STRANG, RUTH M. *The Role of the Teacher in Personnel Work*. (4th ed.) New York: Bureau of Publications, Teachers College. Pp. 507. $3.75.

THALER, GEORGE J. AND BROWN, ROBERT G. *Servomechanism Analysis*. New York: McGraw-Hill Book Co., 1953. Pp. 426. $7.50.

THOMPSON, CHARLES B. AND SILL, ALFREDA P. *Our Common Neurosis: Notes on a Group Experiment*. New York: Exposition Press, 1952. Pp. 242. $3.50.

VAN DUSEN, CLARENCE R. *Training the Voice for Speech: A Guide to Voice and Articulation Improvement*. (2nd ed.) New York: McGraw-Hill Book Co., 1953. Pp. 286. $4.00.

VERNON, MAGDALEN D. *A Further Study of Visual Perception*. New York: Cambridge University Press, 1952. Pp. 300. $7.00.

WEBB, KENNETH B. AND WEBB, SUSAN. *Summer Magic: What Children Gain from Camp*. New York: Association Press, 1953. Pp. 169. $2.50.

WEIDER, ARTHUR, ED. *Contributions Toward Medical Psychology: Theory and Psychodiagnostic Methods*. (2 vols.) New York: Ronald Press, 1953. Pp. 921. $12.00.

WISE, JACOB H. AND OTHERS. *The Meaning in Reading*. (3rd ed.) New York: Harcourt, Brace and Co., 1953. Pp. 252. $2.50.

WOLFF, WERNER AND PRECKER, JOSEPH A. *Personality Monographs: Success in Psychotherapy*. (vol. 3) New York: Grune and Stratton, 1952. Pp. 196. $4.75.

Abstracts

ANDERSON, V. A. A modern view of voice and diction. *Quart. J. Speech*, 39, 1952, 25-32.

Author concludes that the day of the affected, obviously cultivated voice has passed. Training should be directed toward effective communication in vocational and social situations. (*C.F.D.*)

BACKUS, O. Collaboration among psychiatrists, pediatricians, clinical psychologists and speech therapists. *Nerv. Child*, 9, 1952, 242-256.

The author discusses the need of and the growing trend toward inter-communication among the specialists in the four fields. Boundary lines between these fields should be regions of shared activity existing on three levels: (1) the level of theory; (2) knowledge of the working principles of each field; (3) the level of clinical practice. (*L.L.H.*)

ARNOLD, G. E. Medico-legal evaluation and vocational guidance in cases of voice and speech disorders. *Clin. Med.*, 58, 1951, 120-121.

The author points out that abnormal voice and speech are not generally considered in the evaluation of occupational disability. He feels that more consistent distinction should be made between these 'forms of oral expression' and that the examination for voice and speech disorders in insurance medicine should follow the same principles as for all other disabilities. (*S.J.O.*)

Films on hearing and speech. *Hearing News*, 19(11), 1951, 7-10.

A listing of 23 16 mm. films on hearing and speech includes a brief description of each film. Names and addresses of sources are arranged alphabetically by states. (*A.J.B.*)

CHASE, N. Speech in the elementary school. *Elem. Engl.*, 30, 1953, 137-141.

Better communication in the elementary school can be encouraged if the speakers have items of interest to relate, if the audience is interested, and if the children strive for goals of audibility, distinctness of enunciation, accurate pronunciation, voice control (volume, pitch, quality, and melody), easy natural delivery, and audience contact. (*C.G.W.*)

LOW, G., SHEETS, B., PTACEK, P. AND BEASLEY, J. Personality changes as a result of speech therapy. *West. Speech*, 17, 1953, 5-17.

Four articles, modifications of discussions presented at the 1951 convention of ASHA, consider (1) possible personality changes as a result of speech therapy, (2) trends toward the integration of personality development and speech therapy, (3) possible deterrents to this integration, and (4) the description of a program in which there is an attempt to achieve closer integration between personality development and speech therapy. (*C.G.W.*)

HULTZÉN, L. Pronunciation. *Elem. Engl.*, 29, 1952, 402-406, 413.

The teacher should know what a healthy language is and should do nothing to interfere with it. The pronunciation of one dialect is just as good as that of any other, and the basis for preference in pronunciation is usually nonlinguistic. This article discussed such topics as dialect, words, pro-

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Abstracts is edited by Jack Matthews, University of Pittsburgh, assisted by the following committee: Asa J. Berlin, Pennsylvania State College; Virginia B. Carroll, Minneapolis Veterans Hospital; Charles F. Diehl, University of Kentucky; James V. Frick, Pennsylvania State College; Lester L. Hale, University of Florida; Frank M. Lassman, University of Minnesota; Georgiana M. Peacher, Temple University; Sylvia O. Richardson, San Diego, Calif.; George H. Shames, University of Pittsburgh; D. C. Spriestersbach, State University of Iowa; Jesse J. Villarreal, University of Texas; Charlotte G. Wells, University of Missouri. The committee systematically reviews 203 journals for articles of interest to members of ASHA.

nouncing dictionaries, and the 'flow of speech' in conversation. (*C.G.W.*)

MOORMAN, C. How can we communicate? *Childh. Educ.*, 29, 1953, 263-266.

An elementary principal considers ways of making ourselves clear and establishing better communication among teachers, children, and parents. (*C.G.W.*)

NEWTON, L. H. The child who is different. *J. nat. Educ. Ass.*, 41, 1952, 356-357.

An account of the work of private and public agencies working together in building Arizona's Special Education Program. (*L.L.H.*)

NULTON, L. That silent one. *Childh. Educ.*, 29, 1952, 168-170.

A classroom teacher explains the approaches she makes to the child who does not talk in school. (*C.G.W.*)

ROTHMAN, E. AND BERKOWITZ, P. The language arts program as personality projection. *Understanding the Child*, 22, 1953, 11-15.

The authors describe an experiment where projective methods in the classroom are used with emotionally disturbed children. One of the implications of this kind of teaching is that a psychologically oriented teacher can become intimately aware of the children while contributing toward making the language arts program one which provides opportunities and outlets for spontaneous verbal creativity. (*L.L.H.*)

WILKINS, J. Speech therapy in Great Britain. *Quart. J. Speech*, 38, 1952, 416-422.

A comprehensive report of the historical development of speech therapy as a profession in England. (*C.F.D.*)

DARCY, N. T. A review of the literature on the effects of bilingualism upon the measurement of intelligence. *J. genet. Psychol.*, 82, 1953, 21-53.

A review of a representative number of studies which report the effects of bilingualism upon the measurement of intelligence. (*C.F.D.*)

JOHNSON, G. B. Bilingualism as measured by a reaction-time technique and the relationship between a language and a non-language intelligence quotient. *J. genet. Psychol.*, 82, 1953, 3-9.

Author concludes that measuring the intelligence of bilingual subjects is probably related to language factors which possibly render both linguistic (Otis) and performance (Goodenough) tests invalid. (*C.F.D.*)

MCCARTHY, D. Some possible explanations of sex differences in language development and disorders. *J. Psychol.*, 35, 1953, 155-160.

Difficulty for the male infant in identifying with the mother, different parental attitudes toward the two sexes, and a relative lack of linguistic stimulation are among the tentative explanations offered. (*J.V.F.*)

BANGS, J. L. AND BANGS, T. E. Hearing aids for young children. *Arch. Otolaryng., Chicago*, 55, 1952, 528-535.

The techniques for hearing loss diagnosis in children, the nature and function of auditory training, and its application to the problem of hearing aid selection in children are described. (*F.M.L.*)

HELLER, G. A statistical study of otitis media in children. *J. Pediat.*, 42, 1953, 185-188.

A statistical survey of otitis media based on 1031 cases seen in private practice, 1946-1952. Evaluation of the results confirms the author's opinion that conservative treatment of otitis media is best in children. (*S.O.R.*)

KOHLMOOS, H. W. Hearing impairment in children. *Calif. Med.*, 78, 1953, 33-36.

A brief discussion of the salient features of the types of hearing impairment seen most commonly in children. Etiology, diagnosis, and treatment are discussed, with emphasis throughout on the importance of prevention. (*S.O.R.*)

LEDERER, F. L. AND MARCUS, R. E. The adult and his hearing problem. *Ann. Otol., etc., St Louis*, 61, 1952, 126-143.

Complete rehabilitation of the patient with the hearing loss cannot be reached without thorough study and discussion of the personal, social, and economic implications of the problem. Hearing partially but not sufficiently creates a problem that may reach into his family life, may threaten his job security and his social life.

The otologist must become aware of these implications. He must first establish

an accurate diagnosis based upon a careful history of otologic symptoms and disease, as well as constitutional data. History-taking must be conducted within an orientation where hearing loss is a symptom, not a diagnosis. The otologist's questions must be designed to allow the patient to talk freely about his sensory experiences and other pertinent data.

The complete program at Illinois Eye and Ear Infirmary includes classes in Auditory Education. The classes have eight to 12 patients, are conducted twice weekly for two weeks, and last for two hours. The topics covered include: (a) psychology of hearing loss; (b) anatomy, physiology, and pathology of the ear; (c) explanation and illustration of each person's hearing loss; (d) hearing aids, their use, abuse, and maintenance.

The group sessions are conducted informally. The patients are encouraged to talk freely and exchange ideas. After the four group sessions, hearing aid selection is completed for those who are now anxious personally to use the aid. Vocational and family guidance is given by a medical social worker.

'The otologist should be able to advise and counsel the patient for whatever specific hearing rehabilitative measures are indicated.' (*F.M.L.*)

Sortini, A. J. Efficacy of acoustic programs. *Volta Rev.*, 54, 1952, 201-203.

A brief review of studies and opinions about the components of a good hearing rehabilitation program. (*A.J.B.*)

Marshall, T. A. How to make a good ear impression. *Nat. Hearing Aid J.*, 5, 1952, 5-7.

Procedure in taking an ear impression is described, with six pictures showing sequence. (*F.M.L.*)

Tasaki, I., Davis, H. and Legouix, J. P. The space-time pattern of the cochlear microphonics (guinea pig) as recorded by differential electrodes. *J. acoust. Soc. Amer.*, 24, 1952, 502-519.

When pairs of electrodes were placed on either side of the cochlear partition, the microphonic of a 1- to 2-mm. segment of the partition could be recorded without contamination by action potentials. The outputs from each turn were intercompared with respect to amplitude and phase as a function of frequency. The space-time pattern thus described was a traveling wave which moved up the cochlea a distance dependent upon frequency. Low frequencies moved farther up the cochlea than high. The cochlea microphonic has great amplitude in basal turn. Velocity is much greater in basal than apical turn. Significant phase differences were shown by Lissajous figures between the responses of the first and third turn. Space-time pattern was little affected by removal of portions of cochlear bony wall or delivering acoustic energy through hole near apex. (*F.M.L.*)

Ruedi, L., Furrer, W., Luthy, F., Nager, G. and Tschirren, B. Further observations concerning the toxic effects of streptomycin and quinine on the auditory organ of guinea pigs. *Laryngoscope*, 62, 1952, 333-351.

Protracted injection of large doses of streptomycin to five guinea pigs produced severe cochlear and vestibular functional impairment measured by pinna reflex and microphonics. Disfunction was correlated with marked organ of corti degeneration, ascending degeneration of the different nerve fibers, and marked pathological changes of stria vascularis. (*F.M.L.*)

Gidoll, S. H. Quantitative determination of hearing to audiometric frequencies in the electroencephalogram. *Arch. Otolaryng., Chicago*, 55, 1952, 597-601.

One case is reported of auditory acuity measurement in an infant, using EEG indices. (*F.M.L.*)

Kristensen, H. Acoustic-vestibular function in acoustic neurinoma. *Acta psychiat., Kbh.*, 27, 1953, 287-301.

Report on two cases of surgically verified acoustic neurinoma which did not experience recruitment as determined by the Fowler loudness balance test. (*V.B.C.*)

Metz, O. Threshold of reflex contractions of muscles of middle ear and recruitment of loudness. *Arch. Otolaryng., Chicago*, 55, 1952, 536-543.

An acoustic impedance bridge is employed to indicate the effect on the tympanic membrane of intra-aural muscle contraction or other middle ear impedance changes. The muscle reflex is elicited by a 70 to 90 db

intensity in normals, and most readily by 1000 to 2000 cps tones. The reflex is not seen in otosclerotics. Threshold values for eliciting reflex in cochlea nerve lesion are the same as for normals, but reflex cannot be obtained in two patients with verified angle tumors. (*F.M.L.*)

KRISTENSEN, H. K. Acoustic and vestibular function in guinea pigs after removal of the membranous external semicircular canal. *J. Laryng.*, *66*, 1952, 259-275.

Unilateral and bilateral cutting of the lateral semicircular canal in guinea pigs, after Cawthorne's procedure in treating unilateral Meniere's disease, abolished function in the operated canal with no impairment of function either in hearing or of vertical semicircular canals. (*F.M.L.*)

THOMAS, R. The mechanism of the cochlea. *J. Laryng.*, *66*, 1952, 543-551.

Physical arguments are offered for a purely hydrodynamic theory of localization of pitch sensitivity, that the cochlear fluids are alone responsible. The cochlea consists, in this theory, of a series of fluid layers or columns which respond differently to stapes action. The theory is applied to known physiological and pathological phenomena. (*F.M.L.*)

HILDING, A. C. Studies on the otic labyrinth. II. A theory on the stimulation of the organ of corti by sound vibrations. *Ann. Otol., etc., St Louis*, 61, 1952, 371-383.

A theory is developed for transforming cochlear fluid disturbance into a localized stimulus on the organ of corti. The mechanism is a shearing force applied through the tectorial membrane to only one spot on the organ of corti. The shearing force is directed in the axis of the relatively firmly fixed fibrils. (*F.M.L.*)

FERNANDEZ, C. Dimensions of the cochlea (guinea pig). *J. acoust. Soc. Amer.*, 24, 1952, 519-523.

Microscopic measurements were made of the spiral lamina, Rosenthal's canal, basilar membrane, canals and windows, and of the hair cells. Results are plotted graphically as function of position along the cochlea. (*F.M.L.*)

THURLOW, W. R., DAVIS, H., WALSH, T. E. AND ELDERT, E. A third statistical study of auditory tests in relation to the fenestration operation. *Laryngoscope*, 61, 1951, 124-137.

Some relationships between various speech and pure tone tests of hearing are considered in this study of over 100 fenestration cases. Test-retest reliability of Test No. 9, Test No. 14 and live voice spondees was uniformly high. Live voice maximum articulation scores were consistently higher than those obtained by the recorded version, making them significantly less discriminating as a sensitive tool in measuring auditory discrimination. Audiometric slope (in terms of increasing loss with increasing frequency) was found to be related to lower maximum articulation scores. The maximum articulation score was raised as the test was presented at levels 35 db and above the No. 9 threshold. There was apparently no significant correlation between size of fenestra and gain in hearing for speech. As reported in previous studies by this group, gain for speech (23.52 db) was significantly greater than pure tone average (19.98 db) over the 512-2896 cycle range, but approximated the gain for 512 and 1024 cycles. Fenestration did not significantly alter the maximum articulation score of operated ears, and the gain for speech showed significant correlation with the pre-operative difference between loss by air and by bone (average of 512-2896 cycles). (*L.G.D.*)

LINDSAY, J. R., SCHUKNECHT, H. F., NEFF, W. D. AND KIMURA, R. S. Obliteration of the endolymphatic sac and the cochlear aqueduct. *Ann. Otol., etc., St Louis*, 61, 1952, 697-716.

Obliteration of the endolymphatic sac in seven cats failed to show conditioned auditory changes or significant histological changes after three to nine months. Blocking the periotic duct of the cochlear aqueduct in two cats showed no histological inner ear changes or auditory diminution after four and eight months. (*F.M.L.*)

ROSE, J. AND GALAMBOS, R. Microelectrode studies on medial geniculate body of cats. I. Thalamic region activated by click stimuli. *J. Neurophysiol.*, 15, 1952, 343-358.

The authors used supramaximal clicks to stimulate the ears of 13 cats. Responses in the medical geniculate were recorded by mi-

croelectrodes. Evidence is presented to indicate the defined region within the thalamus which produces particular patterns of responses to clicks not found in other areas. (*V.B.C.*)

GALAMBOS, R., ROSE, J., BROMILEY, R. AND HUGHES, J. Microelectrode studies on medial geniculate body of cat. II. Response to clicks. *J. Neurophysiol.*, 15, 1952, 359-380.

This is the second in a series of reports of electrophysiological responses to microelectrodes placed in the medial geniculate. Stimulus used was clicks delivered to the ears of cats. The location of the electrode and the type and intensity of stimulation are correlated. Findings are related to problems in neurophysiology and acoustic neurology. (*V.B.C.*)

GALAMBOS, R. Microelectrode studies on medial geniculate body of cat. III. Response to pure tones. *J. Neurophysiol.*, 15, 1952, 381-400.

This is the third of the series of studies on microelectrode responses to various stimuli. Results of pure tone stimuli as opposed to clicks are discussed, including single and multiple unit stimuli, attenuation, variations in frequency and intensity. (*V.B.C.*)

BLACK, J. W. AND TOMLINSON, W. B. Loud voice: immediate effects upon the speaker. *Speech Monogr.*, 19, 1952, 299-302.

Changes in the oxygen-carbon dioxide balance and pulmonary flow of 40 male subjects during a period of sustained intense speaking were studied as a beginning attempt to quantify the physiological effects of normal talking. (*D.C.S.*)

GARVEY, W. D. The intelligibility of speeded speech. *J. exp. Psychol.*, 45, 1953, 102-107.

A new technique for accelerating speech, based on chopping out portions of the speech record on a plastic base recording tape, is utilized to inquire into the effect of accelerated speech on loss of intelligibility. At twice the original speed there is no effect upon intelligibility of discrete spondaic words; at 2.5 acceleration there is less than 10% loss in intelligibility. (*C.F.D.*)

WHITE, S. J. How far can I mismatch? *Audio-Engin.*, 35(1), 1951, 15, 37-39.

Frequent problems involved in amplifier output and speaker impedance matching are considered. The degree of mismatch allowable varies with the amplifier power output need, several hundred per cent mismatch having no observable aural effect under specified conditions. Mismatching should be done upward (higher load than amplifier impedance) to prevent attenuation of lower frequencies. The ratio between rated and internal impedance is discussed along with constant-power and constant-voltage regulation. Two charts. (*L.G.D.*)

LYNIP, A. W. The use of magnetic devices in the collection and analysis of the preverbal utterances of an infant. *Genet. Psychol. Monogr.*, 44, 1951, 221-262.

As a solution for what the writer feels is unreliable reporting of infant utterances, the use of a magnetic recorder and the Sound Spectrograph is suggested. The Spectrograph (a recent development of Bell Telephone Laboratories, Inc.) provides pictorial analysis of sound samplings secured previously on a magnetic recorder. (*C.F.D.*)

HALL, F. G., BLACK, J. W., NEELY, K. K. AND HALL, K. The influence of loud speaking on pulmonary gas exchange. *J. Aviat. Med.*, 23, 1952, 211-215.

Ten adult males read loudly on 15 occasions under various conditions of reading time and rest preceding reading. Measurements of O_2 and CO_2 were obtained. Results indicated that loud speaking involves hyperventilation. During hyperventilation CO_2 is washed out of the lungs. Subsequent to the loud talking there is a period of reduced respiration during which re-establishment of normal gaseous balance begins. Balance is not regained within six minutes. (*J.M.*)

LIBERMAN, A., DELATTRE, P. AND COOPER, F. The role of selected stimulus-variables in the perception of the unvoiced stop consonants. *Amer. J. Psychol.*, 65, 1952, 497-516.

The authors investigated the effect of one acoustic variable on the perception of [t], [p], and [k] when combined with seven representative vowels. These syllables were converted into sound by a playback from spectrograph patterns. Consonant range was

from 360 cps to 4320 cps. Thirty S's were used to identify the consonants when they were cut off before the vowel. Identification of [p] and [k] was more dependent on contingent vowel. At the lower frequencies, [k] was easier to identify, while above 3000, [p] was. Authors conclude the acoustic variable is probably the sound pattern of the consonant vowel combination. (*V.B.C.*)

PRONOVOST, W. A survey of facilities for the hearing handicapped in New England. *Nat. Hearing Aid J.*, 4(5), 1951, 6-7.

This survey report is primarily in tabular form, based on a 16.2% return of 3870 questionnaires, or an estimated 60% of the known hearing programs. Items covered include availability of testing and training, results of hearing test surveys and a breakdown of individuals receiving diagnostic and remedial work. An incidence of 6.1% hearing handicapped children (criteria not given) was found in survey. (*L.G.D.*)

VILLCHUR, E. The reproduction of sound. *Phys. Today*, 5, 1952, 10-13.

This paper is a brief history, from the late 18th century to the present, of developments in sound reproduction. (*J.V.F.*)

MILLER, G. What is information measurement? *Amer. Psychologist*, 8(1), 1953, 3-11.

A brief statement of the basic concepts of information measurement, their implications for psychological research, and a word of caution against their uncritical application. (*J.V.F.*)

ANDERSON, H. Needed research in listening. *Elem. Eng.*, 29, 1952, 215-224.

Within the last quarter-century, the ear has regained the position of importance which it lost after the invention of the printing press; but listening is 'the forgotten language art.' Research is needed to answer questions in these categories: (1) How much time is devoted to listening? (2) How important is listening in modern life? (3) How well do pupils listen? (4) What is the nature of listening as a language art? (5) What are the similarities and differences between listening and reading? (6) What factors influence the quality of listening in and out of school? (7) Can the art of listening be successfully taught? (*C.G.W.*)

ANDERSEN, M. Teaching aids for a cerebral palsy classroom. *Crippled Child*, 30(3), 1952, 18-21.

'The aim of this article is to suggest eye-hand coordination materials for the cerebral palsied child who is ready for more formal school experiences than those of the nursery school.' (*J.V.F.*)

BAILEY, P. Challenging neurological diseases. *Crippled Child*, 30(2), 1952, 8-10.

This article describes the five major types of program carried out by the National Institute of Neurological Diseases and Blindness which was established by Congress in 1950. The types are: (1) grants-in-aid to help support scientific research at universities; (2) scientific research conducted at the Institute's own laboratories; (3) a fellowship program to help support promising research students; (4) a program of traineeships to help medical practitioners and allied professional personnel receive specialized training; and (5) a program of grants-in-aid to medical schools. (*J.V.F.*)

HEILMAN, A. Intelligence in cerebral palsy: a new interpretation of research studies. *Crippled Child*, 30(2), 1952, 11-13, 28.

Several recent studies indicate that the intelligence of cerebral palsied children is not as high as has been believed. In five of these studies (a total N of 1002), 'Approximately 45 per cent of these children were classified by the investigators as mentally defective, while roughly 30 per cent were classed as slow learning. The remaining 25 per cent were considered to have average intelligence or higher.' (*J.V.F.*)

HEYMAN, C. AND MARTORANA, A. Painting for the crippled child. *Crippled Child*, 30(5), 1953, 16-19.

'It provides fun and muscle training, but even more; it also offers a clue to the youngster's secret thoughts.' (*J.V.F.*)

MALMO, R., DAVIS, J. AND BARZA, S. Total hysterical deafness: an experimental case study. *J. Personality*, 21, 1952, 188-204.

A discussion of the rationale in using auditory stimulation as a conditioning technique with a case of hysterical deafness. The patient's electromyograph reaction to auditory stimulation was noted in the 'deaf' period and after she recovered her hearing. The authors believe the conditioned re-

sponse technique helps in differential diagnosis between hysterical deafness and malingering. Also, when conditioning followed the return of hearing in their case, they believe it accounted for the lasting results. (*V.B.C.*)

PERRY, E. Teaching the cerebral palsied to read. *Crippled Child*, 30(3), 1952, 4-7.

Several of the special handicaps associated with cerebral palsy which make learning to read difficult are described together with some helpful methods and techniques to aid the learning process. (*J.V.F.*)

ROGAL, A. Motivation: one role of the therapist. *Crippled Child*, 30(3), 1952, 13-15, 29.

A description of some ways in which the physical therapist can 'encourage the child to desire actively and freely to participate in activity which will result in physical progress.' (*J.V.F.*)

SIEVERS, D. J. AND NORMAN, R. D. Some suggestive results in psychometric testing of the cerebral palsied with Gesell, Binet, and Wechsler scales. *J. genet. Psychol.*, 82, 1953, 69-89.

Study reports the results of the use of the Gesell, Binet, and Wechsler scales with 34 cerebral palsied patients ranging in age from 9 months to 54 years, and presenting differing diagnoses. (*C.F.D.*)

NELSON, R. Bulbar poliomyelitis: its sequelae in the speech processes, with some suggestions for therapy. *West. Speech*, 16, 1952, 221-232.

This article considers some of the concepts of poliomyelitis which are generally accepted by the medical profession; discusses the effects of poliomyelitis, particularly the bulbar type, on the central nervous system and on speech; and presents general principles of speech therapy to be used when dysphonia or dysarthria have resulted from poliomyelitis. A bibliography of 35 items is included. (*C.G.W.*)

DENNY-BROWN, D., MEYER, J. AND HORENSTEIN, S. The significance of perceptual rivalry resulting from parietal lesion. *Brain*, 75, 1952, 433-471.

The authors discuss in detail a case with a presumed vascular lesion in the right parietal cortex. Some of the characteristics are extinction of one of two stimuli, loss of tactile and postural discrimination, and persistent, complete ignoring of the left side of the body. Right parietal hemisphere lesions result in a perceptual defect in which each set of stimuli is treated as a whole, but in which those poorly differentiated ones are eliminated in favor of those better perceived. Such an impairment in spatial summation is labelled 'amorphosynthesis.' (*V.B.C.*)

HEALD, J. AND MARZOLF, S. Abstract behavior in elementary school children as measured by the Goldstein-Scheerer Stick Test and the Weigl-Goldstein-Scheerer Color-Form Sorting Test. *J. clin. Psychol.*, 9, 1953, 59-62.

The authors used the Goldstein-Scheerer Stick Test and the Weigl-Goldstein-Scheerer Color Form Sorting Test to determine applicability with brain injured children. They used elementary school children from 6 to 11 to establish norms. In the stick test, 99.8% of the children made all correct responses at age 10. In the sorting test, 100% of the children sorted all blocks correctly for both color and form by age 10. There was an upward trend in the mean as age increased for both tests, but more differentially for the color-form sorting. (*V.B.C.*)

SIMMEL, M. AND GOLDSCHMIDT, K. Prolonged posteclamptic aphasia. *Arch. Neurol. Psychiat.*, 69, 1953, 80-83.

A detailed account is presented of the language difficulties in a case of eclampsia at childbirth. The case is considered unique because of the amount of aphasia remaining after seven years. The authors state most patients either recover in a short time or live in a purely vegetative state until an early death. (*V.B.C.*)

STAMM, C. The significance of aphasia in otology. *Laryngoscope*, 63, 1953, 44-57.

The author describes briefly the types of aphasia occurring in otological practice: (1) Motor aphasia (Broca), (2) Sensory aphasia (Wernicke), (3) Global aphasia (Wepman), and (4) Amnesic aphasia (semantic aphasia of Head). The latter is most commonly seen by otologists. (*S.O.R.*)

DEVOSS, H. A study of the factors relative to the incidence of cleft palate births from 1945 through 1949 in San Bernar-

dino county. *Speech Monogr.*, 19, 1952, 303-308.

On the basis of a search of the birth records from 1945 through 1949 of San Bernardino county, California, 42 cases of cleft lip, cleft palate or cleft lip and palate were discovered. Pertinent data from these records were compared with similar data from a group of birth records of 50 normal births randomly selected from the same period. In addition, the mothers of each of the children born with a cleft were interviewed with particular reference to heredity and the period of pregnancy. (*D.C.S.*)

James, G. J. Universal appliance for the treatment of cleft palate. *Dent. Surv.*, 29, 1953, 171-175.

Obtaining a stable retention of prosthetic appliances for edentulous cases is a problem requiring minute fitting procedures. The recesses of the cleft and the vomer can be utilized for this purpose when surgery has not been employed. For post-operative cases, retention is obtained through a peripheral seal. Compensatory movements of the posterior constrictor muscles around the posterior portion of the appliance is encouraged for more functional speech. Illustrative plates of a Fitz Gibbon type of appliance are presented. (*G.H.S.*)

Lowry, P. C. Acrylic hollow bulb for cleft palate denture. *Dent. Surv.*, 28, 1952, 1666-1668.

From the standpoint of comfort, efficiency, and appearance, the acrylic hollow bulb seems most satisfactory. Its lightness of weight facilitates retention and thereby eases the swallowing function and promotes the regeneration of tissue. (*G.H.S.*)

Kettle, M. A. The orthodontic treatment of cleft palate using the Harvold principles. *Dent. Rec.*, 72, 1952, 32-35.

The form of the dental arch is intimately related to the pressure exerted by the tongue, cheeks and lips. The ultimate position of the teeth is considered an expression of these forces. In cleft palate and hare-lip, lip pressure is lost and the pre-maxilla is thrust forward and upward. Early surgery aims at closure of the lip and front of the hard palate which restores lip tension, and retracts the pre-maxilla into position. A mesial drift of the maxillary segments closes the cleft anteriorly. Surgery between 2-4 years of age appears to hasten this movement when it has not already taken place. Segments of the upper arch are moved together in front by pressure from the lips and cheek until alveolar processes are in contact. The arch is reduced in proportion to the width of the cleft. During the early years, these pressures control pre-maxillary position in a favorable way. However, a tight lip later arrests the forward growth of the upper jaw. Orthodontic treatment consists of expanding the upper arch, in cooperation with surgery for loosening the upper lip, to enable a more functional articulation between upper and lower jaw. Illustrative photographic plates are presented. (*G.H.S.*)

Conway, H. Combined use of the push-back and pharyngeal flap procedures in the management of complicated cases of cleft palate. *Oral Surg.*, 5, 1952, 133-142.

Data are presented on 38 cleft palate cases showing that a pharyngeal flap alone or a push-back operation alone results in speech much less adequate than when the pharyngeal flap and push-back operations are combined. A description of this combined process is given with illustrations and sketches. (*G.H.S.*)

Light, R. S. One piece acrylic partial denture for cleft palate. *Dent. Surv.*, 28, 1952, 493-496.

Dr. Light describes in detail, with illustrative plates, the construction of an inexpensive appliance which meets the requirements of ease of construction, ease of cleaning, and ease of handling. A case report is given illustrating the construction and insertion of the appliance. (*G.H.S.*)

Jaynes, H. D. Cleft palate—report of a case. *Amer. J. Orthodon.*, 38, 1952, 258-288.

A detailed description is given of the orthodontic treatment of a 21-year-old girl having malocclusion due to a complete cleft of both hard and soft palate and the lip on the left side. Both palate and lip had been successfully closed by surgery, but the patient presented the typical cleft palate maxillary arch and tooth malformations (V-shaped arch). Speech quality was unusually good, but a defect was present. A Kesling set-up was used to appraise the possibility of the case and determine what teeth would

be utilized or removed to accomplish the best results. The orthodontic treatment involved a rotation of the buccal segment on the side of the cleft, which widened the cleft without disturbing the soft tissue closure. This procedure resulted in an improvement in the appearance of the denture as well as facial balance. (*G.H.S.*)

Lowry, P. C. Congenital cleft palate. *Dent. Surv.*, 28, 1952, 1678-1689.

There are approximately 200,000 cleft palates in the United States. This number increases by 4,600 yearly. The dental profession has as its responsibility the establishment of a central unit for research on cleft palate rehabilitation which could bring together and integrate the knowledge of all relevant professional specialists. This could take place in the Public Health Service. (*G.H.S.*)

Meurman, Y. Operative mediofixation of the vocal cord in complete unilateral paralysis. *Arch. Otolaryng., Chicago*, 55, 1952, 544-553.

An operative method of voice restoration after unilateral complete vocal cord paralysis in 15 patients is presented. A piece of costal cartilage is implanted between the bulk of inner laryngeal muscles and the thyroid ala. The cord is thus brought permanently into a more median position. (*F.M.L.*)

MacMillan, A. S. and Keleman, G. Radiography of the supraglottic speech organs. *Arch. Otolaryng., Chicago*, 55, 1952, 671-688.

Beginning with Scheier in 1897, the history of x-ray studies of the speech organs is detailed. The work of Gutzmann, Russell, Parmenter, Holbrook, Carmody, and many others is given attention. The technique in use by the authors is described. Bibliography includes many citations in foreign journals. (*F.M.L.*)

Humphrey, M. E. Consistency of hand usage; a preliminary enquiry. *Brit. J. educ. Psychol.*, 21, 1951, 214-225.

By means of a questionnaire survey of 70 left-handed and 35 right-handed adult male subjects an assessment was made of the degree of unilateral hand dominance for each subject to determine if the left-handed subjects tended to be less consistent in hand usage than the right-handed subjects. Cerebral dominance and the effects of training and social influence on an individual's hand preference are discussed in the light of the study's findings. (*D.C.S.*)

Madison, L. and Norman, R. D. A comparison of the performance of stutterers and non-stutterers on the Rosenzweig Picture Frustration Test. *J. clin. Psychol.*, 8, 1952, 170-183.

The outstanding results of this study were: (a) Stutterers are found to be significantly more Intro-punitive than non-stutterers; (b) non-stutterers score significantly higher in Obstacle-Dominance; (c) stutterers show higher Need Persistence than the normative group. These findings, the authors point out, seem to correspond to the Psychoanalytic contention that stuttering is essentially compulsive in nature, with anal-sadistic tendencies resulting in a turning inwards of aggression. (*C.F.D.*)

Swartout, J. M. and Benson, W. F. When 'stuttering' is normal. *Today's Hlth*, 301, 1952, 38-40.

The authors emphasize the importance of ignoring what they feel are the normal hesitancies of preschool children. The research of Johnson and his associates is used to substantiate the hypothesis. According to Johnson the main cause of stuttering is the diagnosis itself; it begins not in the child's mouth but in the parent's ear. (*C.F.D.*)

Bakwin, R. and Bakwin, H. Cluttering. *J. Pediat.*, 40, 1952, 393-396.

The clinical characteristics of cluttering are listed as (1) jumbled, partly articulated speech, (2) motor awkwardness, (3) changes in personality and behavior, (4) association with other language defects, (5) alterations in lateral dominance, and (6) family history. There is a brief discussion of pathogenesis, the relation to stuttering, and the treatment of cluttering. (*S.O.R.*)

Walford, A. S. H. The husky voice. *Practitioner*, 167, 1952, 607-614.

A concise discussion of the local and general organic conditions which may cause hoarseness, presented chiefly for the general practitioner or laymen specializing in dysphonia. (*S.O.R.*)

News And Announcements

Syracuse University dedicated its new $400,000 Special Education Building on February 27, 1953. The new building is specially designed throughout to provide a modern center for training of teachers in Special Education, for demonstration of cases to students, for complete diagnostic and rehabilitation procedures, and for special types of research. The building has been made possible through a grant of $150,000 from the James Foundation of New York City, a grant of $50,000 from the Association for the Aid of Crippled Children of New York City and a matching of these funds by Syracuse University.

The building contains offices, college classrooms, laboratories and rooms for special therapy, diagnosis, testing, evaluation. One-way glass windows separate classrooms and laboratories for special teaching and demonstration of cases to students. Two suspended rooms are provided in the installation and a sound proof room and damage proof rooms are provided for treatment of emotionally disturbed children. Special wiring is provided for lecturing to students while cases are being demonstrated and worked with therapeutically. There are 13 individual speech therapy rooms, a speech and phonetics laboratory and a three-room medical diagnostic suite. A number of research projects now in progress are using the newly created facilities. A focus in the program being developed is the integration and extension of services to surrounding areas.

The University is re-naming its hearing and speech center, dedicating it as the Gordon D. Hoople Hearing and Speech Center. The Center is part of the special education program and is housed in the new building. Dr. William M. Cruickshank is Director of the Division of Special Education for Exceptional Children. The Hearing and Speech Center is headed by Dr. Louis M. DiCarlo as executive, professional Director.

Nancy Wood, Assistant Professor of Speech and Hearing Therapy at Western Reserve University has been demonstrating clinical methods in speech therapy to thousands of northern Ohio viewers three times weekly by means of her new tele-course over Cleveland station WEWS. This is part of the University credit tele-course series that began in 1951. Dr. Wood's first course is entitled, 'Your Child Learns To Speak.' The course itself surveys common speech problems and correction procedures. Children from the clinic at the Cleveland Hearing and Speech Center are used to demonstrate problems and procedures.

The Executive Council of the American Association for Cleft Palate Rehabilitation has revised its procedures for processing applications for membership. Applications for membership along with dues will be sent to the Secretary-Treasurer, Dr. Jack Matthews, University of Pittsburgh. The application will then be considered by the Membership Committee via the Chairman of that committee. Action of the committee will be forwarded to the Secretary-Treasurer who will pass the recommendation along to the Executive Council for approval. The Executive Committee recommended to the general membership the adoption of the fiscal year to correspond with the calendar year. Dues paid after July 1st would then be only half dues for that calendar year.

Robert Schaef has been awarded a speech correction fund scholarship for one year beginning February 1953. This award was made possible through a grant of the Kappa Delta Phi sorority to the National Society for Crippled Children and Adults, Inc., who in turn contributed it to the Speech Correction Foundation. Mr. Schaef will pursue graduate work toward the Ph.D. in Speech Pathology and Clinical Psychology at the University of Pittsburgh.

News and Announcements is edited by Charles R. Elliott, Northwestern University, assisted by the following committee: Jane Beasley, University of Alabama; George Gens, Newark (New Jersey) State Teacher's College; Elise Hahn, University of California at Los Angeles; Earl Schubert, State University of Iowa.

Some recent conferences: The Seventh Annual Conference on Current Trends in Psychology at the University of Pittsburgh, Feb. 20 and 21, 1953 was devoted to Information Theory. Proceedings will be published. The first international course in Phonology and Phoniatry was held in Paris March 2-27, 1953. The course was under the direction of Professor A. Aubin and Dr. J. Tarneaud. The Rocky Mountain Speech Conference, Feb. 12-14, 1953 at Denver, Colorado, presented an active program including sections on speech correction. The Annual Spring Meeting of the Wisconsin Speech Correction Association was held Friday, March 13, 1953 at Madison, Wisconsin. Approximately 115 were in attendance at the various workshops held during the day. The Southern California section of the California Speech Association met in Los Angeles, March 9, 1953. The principal speaker was Dr. Lee Travis. The Northern Section of the California Speech Therapy Association met at the Morrison Rehabilitation Center in San Francisco on May 2, 1953. At the American Association of School Administrators Convention at Atlantic City, the Speech Clinic of the Newark, New Jersey, State Teachers College, under the direction of Dr. George Gens, presented an unrehearsed television program. Techniques of diagnosis and therapy in speech correction were presented along with a classroom discussion of the case. The Fifth Annual Institute for Parents of the Pre-School Deaf and Hard of Hearing Children was held May 31 to June 6 at the Kansas School for the Deaf. The program was sponsored jointly by the Department of Speech and Hearing of the University of Kansas Medical Center and the School for the Deaf in Olathe, Kansas.

A number of notes about programs being planned this summer are at hand. The Pennsylvania State College has enlarged clinical facilities in its new suite of therapy rooms and offices in its training center. A six-week residential program for children needing rehabilitation will provide practical experiences for students with course work in the various areas of speech correction. Practicum credits will also be offered in work at Camp Easter Seal, the Preschool Handicapped Residential program, from June 14 to June 26. A two-week symposium from June 16 to June 26 will feature guest lecturers from special areas. Syracuse University will again sponsor a summer residential school from June 29 to August 29. A Cerebral Palsy Workshop will be featured from July 20 to August 7. An expanded program of work will be offered in connection with the newly dedicated Gordon D. Hoople Hearing and Speech Center. The University of Pittsburgh will feature a workshop dealing with the problem of Guidance of Teen-agers and Adults with Cerebral Palsy, July 13 through July 31. Field trips to cerebral palsy facilities in the greater Pittsburgh area will be featured. Scholarships are available. Dr. Darrell Mase will be featured as a visiting professor at Los Angeles State College for the six-week summer session. Mrs. Alma Wedberg will conduct an out-patient clinical practicum for speech correctionists. The Kansas State Society for Crippled Children and the National Society will co-sponsor with the Hearing and Speech Department of the University of Kansas Medical Center a two-week program for Parents and Their Cerebral Palsied Children. This program will be held June 7 to June 20 at the Medical Center in Kansas City. Evening programs in conjunction with this offering will be available to parents in the greater Kansas City area. Dr. Gordon Peterson of the Bell Telephone Laboratories will be featured by the University of Michigan this summer instructing in the Instrumental Analysis of Speech. The United Cerebral Palsy Association is supporting the University of Michigan in a special offering this summer in Cerebral Palsy. Three separate courses will be offered in addition to field trips and demonstration and examination clinics which will be held. A two-week workshop dealing with practical problems of the public school speech correctionist will be featured at the State University of Iowa from June 29 through July 10. The six-week residential speech clinic will be held again with approximately 60 boys and girls in residence June 29 through August 7. Practicum work in speech correction will be offered with this residential population. Western Reserve University and the Cleveland Hearing and Speech Center plan a Voice Institute, August 10-15, as part of a four-week intensive course on Voice Pathology beginning August 3. The Institute will be concerned with teaching esophageal speech, as well as psychological and recreational rehabilitation.

Grants and contracts for scientific research and development at non-profit

institutions by federal agencies totaled $297,000,000 in the year 1951 and $349,000,000 in 1952 according to a report of the National Science Foundation. The figures indicate that in 1952 there was an increase of 20% over 1951 in funds expended for applied research and development and a slight decrease in those for basic research.

The National Science Foundation has awarded a grant of $10,000 to Harvey Fletcher of Brigham Young University for research in musical acoustics.

The Ford Foundation will establish a center for advanced study in behavioral sciences, at a site yet to be selected. Fifty scholars and scientists will assemble annually for study and collaboration. Present plans call for a six-year program at an estimated cost of $3,500,000.

The International Information Administration will sponsor the exchange of 8,000 persons between the United States and 72 other countries. In addition I.I.A. will encourage and assist some 500 organizations, institutions and foreign governments in the exchange of another 8,000 persons on similar projects. Information concerning applications for grants may be obtained by writing to the Superintendent of Documents, U.S. General Post Office, Washington D.C. Ask for Department of State Publication, #492. Enclose 10c in coin.

The American Psychological Association, assisted by a grant from the National Science Foundation, is planning a three-year analysis of the activities of psychologists and of the ideas, facts, and general content of psychology. The study will deal with matters of personnel and training and the relationship of psychologists to universities and other professions and the agencies that make use of psychological service.

Emerson Radio and Phonographic Corporation, 111 8th Avenue, New York 11, has appointed a committee to pass on all applications made by educational institutions for the Emerson $100,000 educational television grant. The first 10 stations to begin broadcasting on a channel allocated for non-commercial educational purposes will receive $10,000 each.

The Acoustical Society of America needs extra copies of the January 1935 issue of its Journal in order to fill orders for complete sets. They will pay $2.75 for a limited number of copies. Contact: W. Waterfall, 57 East 55th Street, New York 22, New York.

The University of Colorado has developed a program of clinical practice and training in speech correction in cooperation with the Boulder Public Schools.

The Parent's group operating in connection with the speech clinic at the State Teachers College at Bloomsburg, Pennsylvania has worked toward formation of car-pools for parent activity and special classes for parents for problems in the handicapped under the auspices of the public schools.

The St. Luke's Hospital in Chicago has expanded its speech and hearing services to include special work with stutterers. The work with stutterers is under the direction of Benjamin M. Jaques.

A Communication Center has been established at Los Angeles State College combining remedial services in speech, hearing, reading and writing. Dr. Robert Douglas will serve as coordinator and Dr. Mary Huber will be in charge of the clinical speech service.

The University of Southern California in conjunction with the John Tracy Clinic will inaugurate a 30-unit program in teacher training for the preschool deaf child beginning in the fall of 1953. A limited number of scholarships on this program will be available for upper classmen.

The Speech and Hearing Clinic of the University of Southern California has expanded its hearing testing facilities with the recent installation of an Allison designed Auditory Test Unit. The recent acquisition of the former John Tracy Clinic buildings has doubled the physical facilities of the clinic. The Parkview Womens Club of Los Angeles is sponsoring the children's program and has been active in equipping the clinic.

The Crippled Children's Division of the University of Oregon Medical School has

been recently reactivated and has expanded its diagnostic training program in speech and hearing. Beginning with the summer session of 1953, the division program will be further expanded when the speech and hearing training program and clinic of the Portland State Extension Program will be moved to the Division Building and will be directed by the speech consultant there. The Crippled Children's Division program serves as a medical and speech diagnostic center for four connected regional centers located at the University of Oregon, Eastern College of Education, Southern College of Education and Oregon College of Education.

Elizabeth Healy Ross, psychiatric social worker, was named to the newly created position of Deputy Chief of the Children's Bureau. Mrs. Ross serves directly under Dr. Margaret Elliot, Bureau Chief, in directing its program of research in child life and administration of grants to the states for extending and improving maternal and child health, crippled children services and child welfare facilities.

A conference on aphasia will be held at the State University of Iowa, June 19-20, under the auspices of the University Council on Speech Pathology and Audiology. Among those participating will be Dr. Joseph M. Wepman, University of Chicago; Dr. Joe Brown, Mayo Clinic; Dr. Helmer Myklebust, Northwestern University; Dr. Russell Meyers, University of Iowa, College of Medicine.

The Coordinating Council for Cerebral Palsy in New York City, will offer its third professional Cerebral Palsy Institute June 29-July 10, 1953, in cooperation with the Speech and Hearing Department at Brooklyn College. The Institute this year will be concentrated on the related problems in the area of speech disabilities of the cerebral palsied. Authorative lecturers, clinical demonstrations, films and seminars will be featured. For further information write to Miss Marguerite Abbott, Executive Director, Coordinating Council for Cerebral Palsy, 509 Madison Avenue, New York, N. Y.

The Louisiana Speech and Hearing Association met in the Department of Speech at Louisiana State University March 13 and 14. The chief purpose of the meeting was to continue work on a handbook they are writing to inform interested persons about the program of speech correction and hearing throughout the state. By-laws were adopted. The organization has recommended using the ASHA requirements for speech therapists in the state (without the experience requirement), and the state has accepted the recommendation. Officers elected for the coming year are: President, Jeanette Laguaitte; Vice President, Cordelia Brong; Secretary-Treasurer, Betty Caraway.

Meetings Announced

American Speech and Hearing Association, November 23-25, Hotel New Yorker, New York City.

American Psychological Association, Sept. 4-9, Western Reserve University, Cleveland, Ohio.

Speech Association of America, week of December 26, Hotel Statler, New York City.

International Congress of Electroencephalography and Neuro-physiology, August 18-21, Boston, Mass.

Northern Section, California Speech Therapy Association, July 8, 389 Bay Street, San Francisco; October 10, Stanford Campus.

Acoustical Society of America, Fall meeting, Oct. 15-17, Cleveland, Ohio.

New England Speech Association Convention, Nov. 27-28, Boston, Mass.

Ninth International Convention for Speech and Voice Disturbances and Therapy of the International Association of Logopedics and Phoniatrics, Sept. 1-7, Milan, Italy. For information write: Dr. Deso A. Weiss, 115 East 86th St., New York 28.

New Materials

The Audio Engineering Society of New York has published its first volume of a new quarterly journal, *The Journal of the Audio-Engineering Society*. The publication is intended to be a new medium for the publication of review and original research articles on broadcasting, audio systems, recording and reproduction of sound, and other topics of interest to the professional audio engineer. Lewis F. Goodfriend is Editor. The annual subscription price for

non-members of the society is $8.00. It may be procured from the Journal Editorial Office, P.O. Box 12, Ochelsea Station, New York 11.

The Society for Clinical and Experimental Hypnosis has established a new quarterly *Journal of Clinical and Experimental Hypnosis*. Papers will be accepted from all areas of clinical and scientific behavior study, but only original research will be published. The Editor is Dr. Milton V. Kline, 500 Riverdale Ave., Yonkers, New York.

A phamplet has been prepared recently by the staff of the Speech Correction Division of the Board of Education of Chicago. The publication is called *Speech Correction Techniques, Materials, References*. A limited number of single copies may be sent to individuals who apply for it. There is no charge.

A report has been received from the Cleveland Hearing and Speech Center on the first International Meeting of Laryngectomized Persons. The report covers comprehensively the meeting and the formation of a new international association of laryngectomees.

The Play Schools Association, 119 West 57th Street, New York 19, has just issued a 15-page booklet for 25c entitled, 'What is a Good Play School.' Procedures, program materials, personnel, space requirements, health and safety factors are dealt with in the phamphlet.

The Federal Security Agency has just issued a bulletin entitled, 'The Severely Retarded Child Goes to School.' Included is a discussion of speech therapy for mentally retarded children. It may be purchased for 20c from the Superintendent of Documents, Washington 25, D.C.

A plug device that slips into the ear and softens loud noises yet permits the hearing of ordinary voice level is available through Sigma Engineering Company, 1491 North Vine Street, Los Angeles, California.

A plastic training cup for babies with a special top and two large handles is available for special training problems with children. It is produced by Weaning Cup Corporation, 1462 South Shandendoa, Los Angeles 35, California.

Graduate Assistantships, Fellowships and Scholarships

This section, an annual feature of the December issue, lists part-time graduate appointments, fellowships, and scholarships specifically designated for graduate work in speech and hearing. General university fellowships and scholarships, unspecified as to area of concentration, and full time graduate positions will not be included. Only those announcements received too late for the December issue are printed in other issues.

Copy should be submitted to the News and Announcements Editor, and should include formal title of appointment, institution, and unit; dates, general duties, and remuneration; name and address of persons receiving applications. Deadline for receiving copy is 20 December, 20 March, 20 June, or 20 September.

Clinical Assistantships. Bill Wilkerson Hearing and Speech Center and Division of Audiology and Speech, Vanderbilt University School of Medicine. Starting September, January, March and June. Half-time; 20 hours per week of clinical assistance in the hearing and speech center. $100 per month. Student expected to enroll for graduate work for M.S. degree in the Division of Audiology and Speech, Vanderbilt University School of Medicine, or M.A. degree in special education, George Peabody College for Teachers. Address Forrest M. Hull, Bill Wilkerson Hearing and Speech Center, 2109 Garland, Nashville 5, Tennessee.

Clinical Assistantships. University of Houston. Speech and Hearing Clinic. Starting February or September. 15 hours a week of clinical assistance. $500 per semester. No remission of tuition. Student expected to enroll for graduate work in speech correction and/or audiology. Address Genevieve Arnold, Speech and Hearing Clinic, University of Houston, Houston 4, Texas.

Graduate Assistantships. University of Oregon. Department of Speech, Speech and Hearing Clinic. Starting September, 1953. 15 hours per week. $900 to $1200. Waiver of tuition fees. Assistant may finish work for M.A. or M.S. by carrying 12 term hours of graduate work for three terms and one summer session. Work consists of diagnosis, treatment, interviewing, and clinical man-

agement. Address Kenneth S. Wood, Speech and Hearing Clinic, University of Oregon, Eugene, Oregon.

News About People

George W. Gens has been appointed consultant in Speech Pathology at the V.A. Hospital at East Orange, New Jersey.

Clarence Webb has been appointed Instructor and Speech Clinician in the University of Buffalo.

John B. Mader has joined the staff of the Alabama College, Montevallo, Alabama as Instructor in Speech Therapy.

Milton Valentine has been appointed Assistant Professor in Speech in the area of Speech Correction at the University of Colorado.

Mary A. Crabill has been appointed Instructor in the area of Speech Correction at the University of Colorado.

Charlotte Wells will be Visiting Professor of Speech Correction at the University of Colorado this summer.

Robert Selb has been appointed Director of the Speech Clinic at Dartmouth College.

Dorothy Funk has been appointed Director of the Hearing and Speech Clinic in Indianapolis, Indiana.

Patricia Smith has joined the speech and hearing staff of the Wabash, Indiana, Public Schools.

Betty H. Dresher has been appointed speech therapist in the Framington Schools, Detroit, Michigan.

Bernard Spilka has joined the staff of the Human Resources Laboratory, Lackland Army Air Base, Texas.

Charles Elliott has been named Associate Director of the Speech Clinic at Northwestern University.

Mildred Berry has been named a Fulbright lecturer in Speech Rehabilitation at the University of Oslo, Norway.

The following speech therapists have been added to the staff of the Division of Speech Correction of the Chicago Public Schools: Lois M. Markin, Barbara Armin Baruch, Jean Brennen Dunn, Sherri S. Zuckerman.